March 31, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 43

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MAR 31 1947
DETROIT

Midwestern manufacturers who require fine quality steel tailor-made to their own particular specifications ask for it by this name ... Granite City Steel.

Granite City Steel Company

GRANITE CITY, ILLINOIS

Chicago • Cleveland
Houston • Indianapolis
Kansas City • Los Angeles

SINCE 1878 GRANITE CITY STEEL

Milwaukee • Memphis
Minneapolis • Moline
New York • St. Louis

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • STAINLESS-CLAD • TIN PLATE
TERNE PLATE • ELECTRICAL SHEETS • TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

"FLOWRATOR" flow rate meter manufactured by Fischer & Porter Co., Hatboro, Pennsylvania

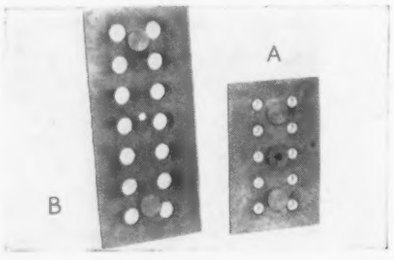
TRIPLING PRODUCTION at the pull of a trigger . . .

It takes 28 studs to secure the two gauge glass hold-down flanges on the Fischer & Porter "Flowrator" pictured above. Formerly, stud installation required drilling 28 holes in the stainless steel casting, tapping each of the 28 holes, and screwing in 28 studs . . . 84 slow, costly operations per unit.

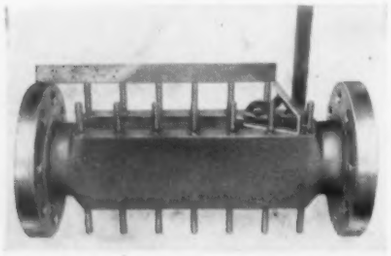
NELSON Automatic Stud Welding trebled production by reducing stud installation to one trigger-quick operation per stud. The operator merely loads the NELSON flux-filled stud with its protective ferrule in the gun chuck, locates the gun legs in the simple template shown, and pulls the trigger. A standard d.c. welding generator furnishes the current, and the NELSON Timer Control unit automatically times the weld cycle. On the job illustrated, the operator averages 150 stud welds per hour.

A three-fold increase in production was but one of the advantages Fischer & Porter gained by adopting NELSON stud welding. Because no holes are drilled in the casting, possibility of leaks around stud holes are eliminated. Slight porosities in the casting encountered in drilling stud holes required expensive filling, or discard of the casting. As no holes are now drilled, porosities are no longer a problem and casting rejects are at a minimum.

If your product uses studs, there's a very good chance that you, too, can save hours and dollars with NELSON Automatic Stud Welding. Full details are yours for the asking . . . write or wire us *now*.



SIMPLE TEMPLATES ASSURE ACCURACY, HIGH PRODUCTION SPEED—Fischer and Porter use two types of inexpensive templates made from ¾" plate to speed accurate stud location. The "tight hole" type (A) locates by means of pilot holes drilled to take the NELSON ferrules with a snug fit. Ferrules are dropped in place and studs welded through ferrules. The "leg positioning" type (B) locates by means of 3 countersunk spots to match the 3 gun leg tips.



Extreme accuracy of location, stud height and alignment are demonstrated in the photo above.

NELSON SALES CORPORATION
2713 TOLEDO AVE.
LORAIN, OHIO

Representing

Nelson Stud Welding Corporation Lorain, Ohio	Nelson Specialty Welding Equipment Corporation San Leandro, California

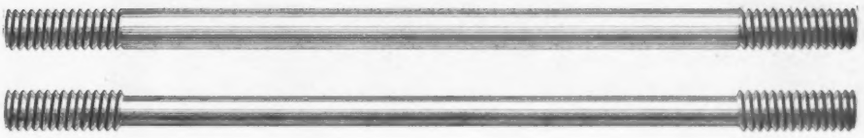
NELSON

TRADEMARK

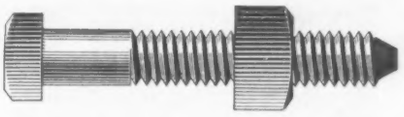
STEEL CONSTRUCTION?

Here are the FASTENINGS You need

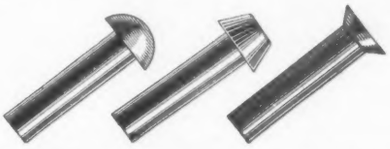
Once the steel construction industry swings into high gear, fastenings will be needed in enormous quantities. Bethlehem specializes in fastenings manufacture. The fastenings shown here are regularly produced by Bethlehem for the steel construction industry. Additional information about these fastenings, or any of the scores of other Bethlehem fastening items, either large or small, standard or special, black or galvanized, will be supplied on request.



TIE-RODS—Plain or upset, with cut- or rolled-threads. Conform to ASTM Specification A-7. Bethlehem tie-rods are supplied in single units up to 46 ft in length. Multiple units come in any length.

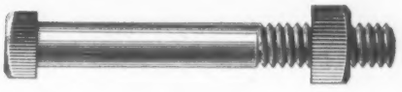


FITTING-UP BOLTS—Made in three types, 70,000 lb to 125,000 lb minimum tensile strength. Furnished with American Standard Regular Unfinished Square Heads, Plain Necks, Semi-Cone Points and American National Coarse or 60 deg Acme Threads.

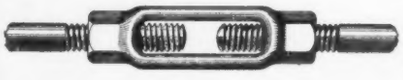


RIVETS—Furnished in small and large sizes. "Small" rivets are made in diameters 7/16 in. and below, lengths 6 in. and shorter, with Button, Cone, Countersunk, Pan or Flat Heads.

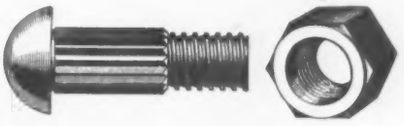
"Large" rivets come in diameters ½ in. to 1¾ in., and in any length, with Button, High-Button, Countersunk, Round-top Countersunk, Cone and Pan Heads.



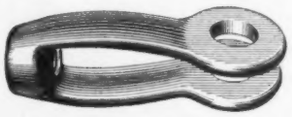
MACHINE BOLTS—Made from carbon or alloy steel in all sizes, with cut- or rolled-threads and with Square, Hexagon, Tee, Button, Countersunk, Hook or Special Heads.



TURNBUCKLES—Made in all sizes, generally with 6 in. openings between heads, but may be obtained with 9 in. and 12 in. openings. Furnished with right- or left-hand threads, with or without stub ends.



DARDELET RIVET-BOLTS—Excellent for use in work where rivets or fitted bolts might normally be used. Usually furnished with Button Heads, but Countersunk and Special Heads can also be supplied.



CLEVISES—Supplied in a complete range of sizes, tapped to American Standard Coarse Thread Series, Class 2. Right- or left-hand threads, with or without pin and cotter.

★ BETHLEHEM STEEL ★

BETHLEHEM STEEL COMPANY

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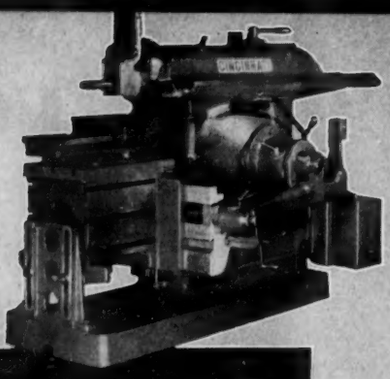
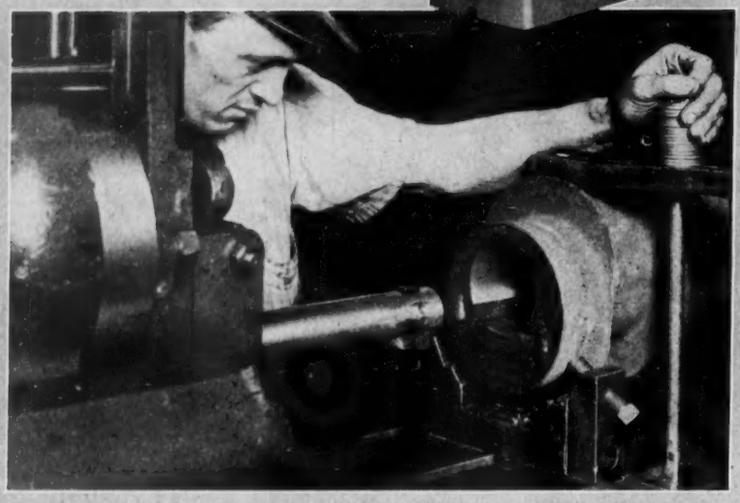
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Bethlehem supplies every type of Fastening

Use a SHAPER





INTERNAL SHAPING

In or out of the tool room, a Cincinnati Shaper is a dependable tool.

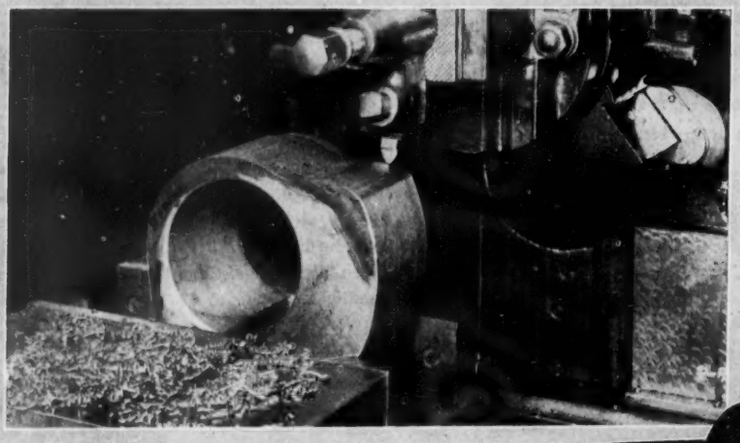
Planing, shaping, contouring, internal shaping, angular shaping, or universal work, are all done on this multi-use machine.

Set-up is simplicity itself.

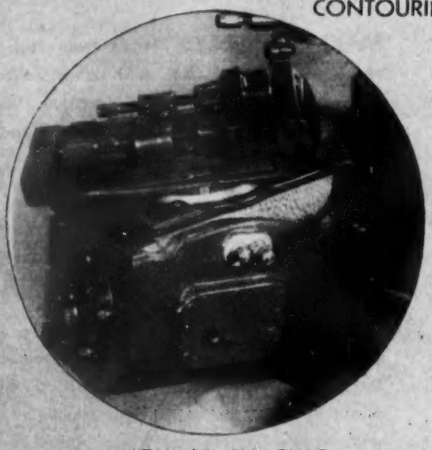
The power, speed and accuracy of Cincinnati Shapers make them efficient for small-lot manufacturing.

Cincinnati Shapers are profitable tools in any shop.

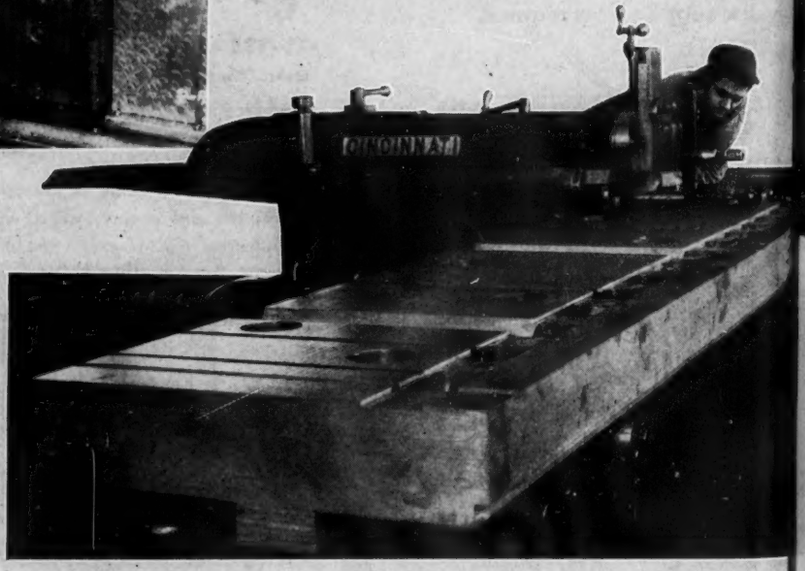
Write for Catalog N-3, and the practical Bulletin — Set-ups on Cincinnati Shapers.



CONTOURING



ANGULAR SHAPING



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THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

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Extra values through

JACK & HEINTZ

Mass Precision

Coming down the home stretch

Jack & Heintz motors help themselves to a complete workout on a 75-foot conveyor. This automatic proving ground gives each motor a run-in at rated voltage, then increases the voltage 30% for another stretch . . . then gives each motor a "ground" test of 1200 volts. Result . . . Manufacturers get *proven* power with Jack & Heintz motors.

This speedy, accurate testing development is another example of Jack & Heintz *mass precision* methods which are being applied to fractional horsepower motors, magnetos, bearings and refrigeration compressors *today*, and to other revolutionary products of *tomorrow.*

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

Write Like Talking

We haven't joined the crusade to eliminate the use of "Dear" in business letters, but we have become exposed to its influence. That particular usage doesn't bother us half as much as some others which schools and colleges have been attempting to eliminate for years without much success. We mean such things as "beg to remain" and "hoping to hear from you, we are". People never really talk that way—but put the average business man in front of a dictating machine or a girl with her notebook, and he acquires a vocabulary which has no more resemblance to his every-day conversation than Steinbeck's prose has to Chaucer's. It's all English, but what a difference! If anyone wants to start a sticker campaign to promote the "write as you speak" idea, count us in.

Further on Inversion

The sharp eyes of our readers make it tougher on our editors than on the editors of almost any other publication. The margin between fact and error is nil insofar as the perfectionists of this industry are concerned. For example, in the March 17 issue we ran a picture of a ladleful of steel being poured in the Broken Hill steel works, Australia. The caption read, "Molten steel being poured into molds. . . . .etc." H. C. Morrison of Great Lakes Steel calls us on it, because the picture shows metal being poured all okay, but not into molds. It is really a ladle pouring hot metal, presumably iron, into an open hearth. Mr. Morrison says that even though they may be on the opposite side of the world, the Australians don't make steel upside down—to which we agree, and point the finger at whichever one of our 28 full time editors edited that caption.

Puzzle Corner

Guess it's time for another small session on problems. We haven't yet seen any exact answers to our reel problem of two weeks ago, so we'll pass along the answer as we found it, which was about 8 7/8 inches in diameter. This is confirmed by one of the Jones boys from Granite City, who solved by the same method—computing the area of the edge of the wound-up strip. A couple of our puzzle fans have taken issue with the age problem, proving to their own satisfaction that while the father and mother both have the same birthday, they are only 12 years apart. We aren't arguing with their logic one bit. All we're doing is sitting here with the answers somebody gave us, plus a sworn statement from that somebody that the answers are right and provable. Since the fiasco of the coconuts, we are completely satisfied that there are many answers to every problem, all of which are wrong except to to the guy who discovered them. However, this week we are going to rely on the logic and arguing ability of one of our readers who sent us this problem. He swears it's possible to work it, and that the answer he submits is the only possible correct one. There were built in the days of Shamed the King 20 miles of straight railroad track pointing toward Mecca. This track was situated exactly on the equator, and geography being what it is in that part of the world, it pointed exactly east and west, as the equator is often known to do. The terrain was perfectly level, so that all points on the track are at the same elevation above sea level. From a point in the center of this track, the distance to the center of the earth is exactly 6378.388 kilometers. King Shamed, however, had learned enough to know that the earth's surface is curved, and he wanted this track to be perfectly straight. He therefore gave orders that the ends of the track were to be raised a certain distance so that the track would be exactly straight. After figuring for forty days and forty nights, the mathematicians of that kingdom confessed their inability to solve the problem and their heads were chopped off forthwith. Had you been there at the time, could you have saved their necks by computing the exact number of inches the track ends would have to be raised? As we already know, you would have been able to do this, so come clean, how many inches?

Inverted Version

It may have been inspired by the pens-that-write-under-water, but for the life of us we can't see the logic in the promotion now being used on a new type of dictating instrument, whose makers claim it will work upside down. Unless, of course, they have their eyes on the markets in Australia, New Zealand, and points down under. And, despite intimations to the contrary from some of our less intimate collaborators around here, this stuff is written at the conventional angle, and not while we're hanging from a convenient limb by our knees.

Hasta, as the saying goes, la vista!

Shrdlu

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STEEL
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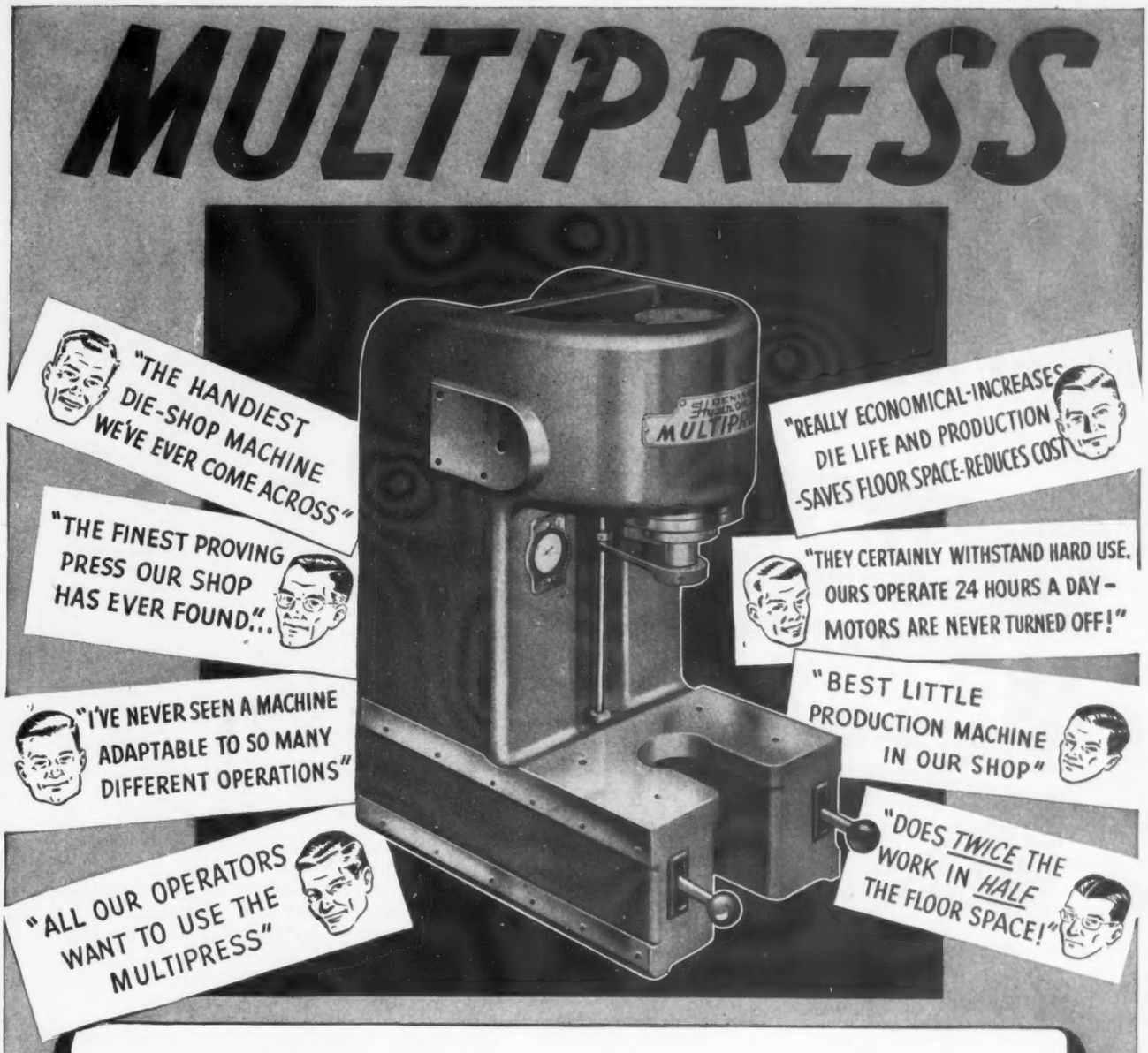
Editorial Staff on Contents Page

MULTIPRESS


"THE HANDIEST DIE-SHOP MACHINE WE'VE EVER COME ACROSS"
"THE FINEST PROVING PRESS OUR SHOP HAS EVER FOUND"...
"I'VE NEVER SEEN A MACHINE ADAPTABLE TO SO MANY DIFFERENT OPERATIONS"
"ALL OUR OPERATORS WANT TO USE THE MULTIPRESS"
"REALLY ECONOMICAL-INCREASES DIE LIFE AND PRODUCTION -SAVES FLOOR SPACE-REDUCES COST
"THEY CERTAINLY WITHSTAND HARD USE. OURS OPERATE 24 HOURS A DAY - MOTORS ARE NEVER TURNED OFF!"
"BEST LITTLE PRODUCTION MACHINE IN OUR SHOP"
"DOES TWICE THE WORK IN HALF THE FLOOR SPACE!"

COMMENTS like these keep pouring in from all kinds of plants, big and little, where MULTIPRESS has been put on the spot by hard-headed production men, tool and die shop operators, and other users.

MULTIPRESS was specially designed *from the ground up* to offer new operating efficiency on the widest possible range of operations. Even so, our engineers are surprised anew, almost daily, by continuing reports of different jobs on which MULTIPRESS is being used with unusual success.

Shop men in every field are discovering how many "extra" jobs MULTIPRESS can handle for them, in addition to its efficiency on all sorts of high-production jobs. With its accurate, fully controlled ram action, quick, easy adjustability and wide-range tooling acceptance, MULTIPRESS is ideal for dozens of "proving" jobs, short production runs and experimental work.

MULTIPRESS—a remarkably compact, space-saving, low-cost, all-purpose press—is built in four, six, and eight-ton capacities—offers seven different models in each size, with manual or automatic controls. In addition, there are many standard MULTIPRESS accessories for all models, such as benches, work-table extensions, side shelves, bolster plates, and attachments for indexing, pelleting, foil-marking and other special applications. *Write today for complete information on this new bench-size tool of one-thousand-and-one uses!*

THE DENISON ENGINEERING CO.
1163 DUBLIN ROAD • COLUMBUS 16, OHIO

HydrOILics INDUSTRY'S RIGHT

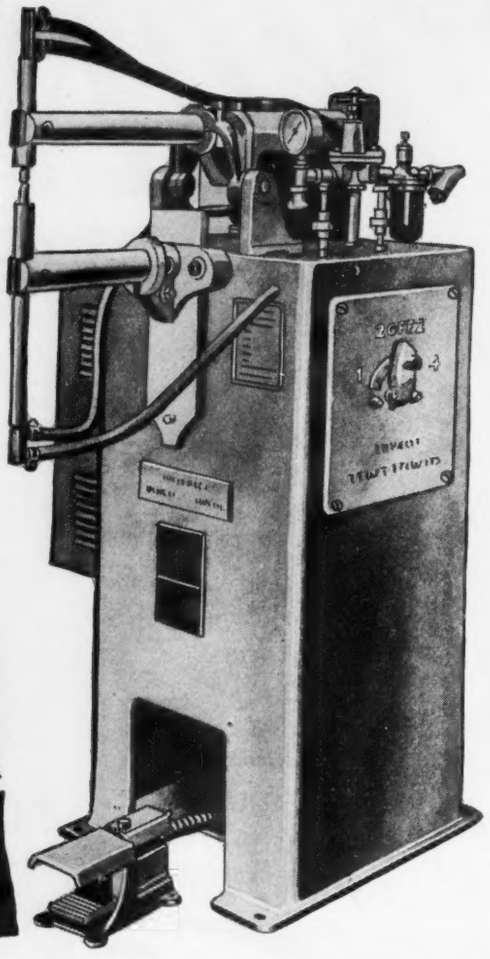
DENISON EQUIPMENT in APPLIED HydrOILics

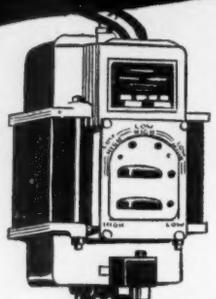
as low as

40%

of market

SURPLUS RESISTANCE WELDERS





Manufacturers can buy at a very low percentage of present market costs resistance welding equipment built by the leaders in the industry. This equipment is now available for immediate delivery and can be put right into the production line.

This equipment can be inspected at most Regional Offices, but the large inventories are located at:

Birmingham • Boston • Detroit • Los Angeles • Minneapolis New Orleans • Philadelphia • St. Louis

Write to these Regional Offices asking that your name be added to the mailing lists for this type of equipment.

EXPORTERS: Your business is solicited. Any inquiries regarding export control should be referred to the Office of International Trade, Department of Commerce, Washington, D. C.

RESISTANCE SPOT WELDERS:

TYPES AVAILABLE: Rocker Arm, Press, Portable or Gun, and some Multi-Electrode types, in well-known makes. Motor, air, hydraulic or manual operation; rated from 10 to 400 KVA; 220-440 volt, 60 cycle, single phase; throat depths 8" to 48"; synchronous and non-synchronous.

CONDITION: Mostly used, some unused.

RESISTANCE SEAM WELDERS:

TYPES AVAILABLE: Longitudinal, Circular, and Universal; also Multi-Electrode types.

RANGE OF SPECIFICATIONS AND CONDITION: Same as Spot Welders.

OTHER TYPES: Butt and Flash resistance welders; and Stored Energy Spot Welders up to 50 KW and 48" throat depth (also a few machines of greater capacity).

All welders are sold under existing priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the materials offered herein.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond Salt Lake City • St. Louis • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1047

WHEN YOUR STORAGE SPACE *has no place to go but UP!*

SOMETIMES there is simply no place to go to find storage space except *up!* How to handle storeyard materials then becomes a problem if you are to take advantage of your areal rights.

Northwest Crawler Cranes bring you the simple, low cost answer. Northwests have ample reach for high piling. They negotiate aisles between stock piles smoothly. They go anywhere, need no tracks and are not confined to small areas as is overhead equipment.

The "Feather-Touch" Clutch Control assures easy operation and makes possible the feel of the load, providing for sensitive, accurate handling. Uniform Pressure Swing Clutches eliminate the jerks and grabs that endanger loads. They are cool running and engage smoothly.

Northwests have proved themselves in some of the country's largest industrial plants handling everything from scrap to coal.

What is your material handling problem? Why not plan ahead to modernize your storeyard practice? Let us send you details on the size machine you need.

NORTHWEST ENGINEERING CO.
1805 Steger Bldg., 28 E. Jackson Blvd.,
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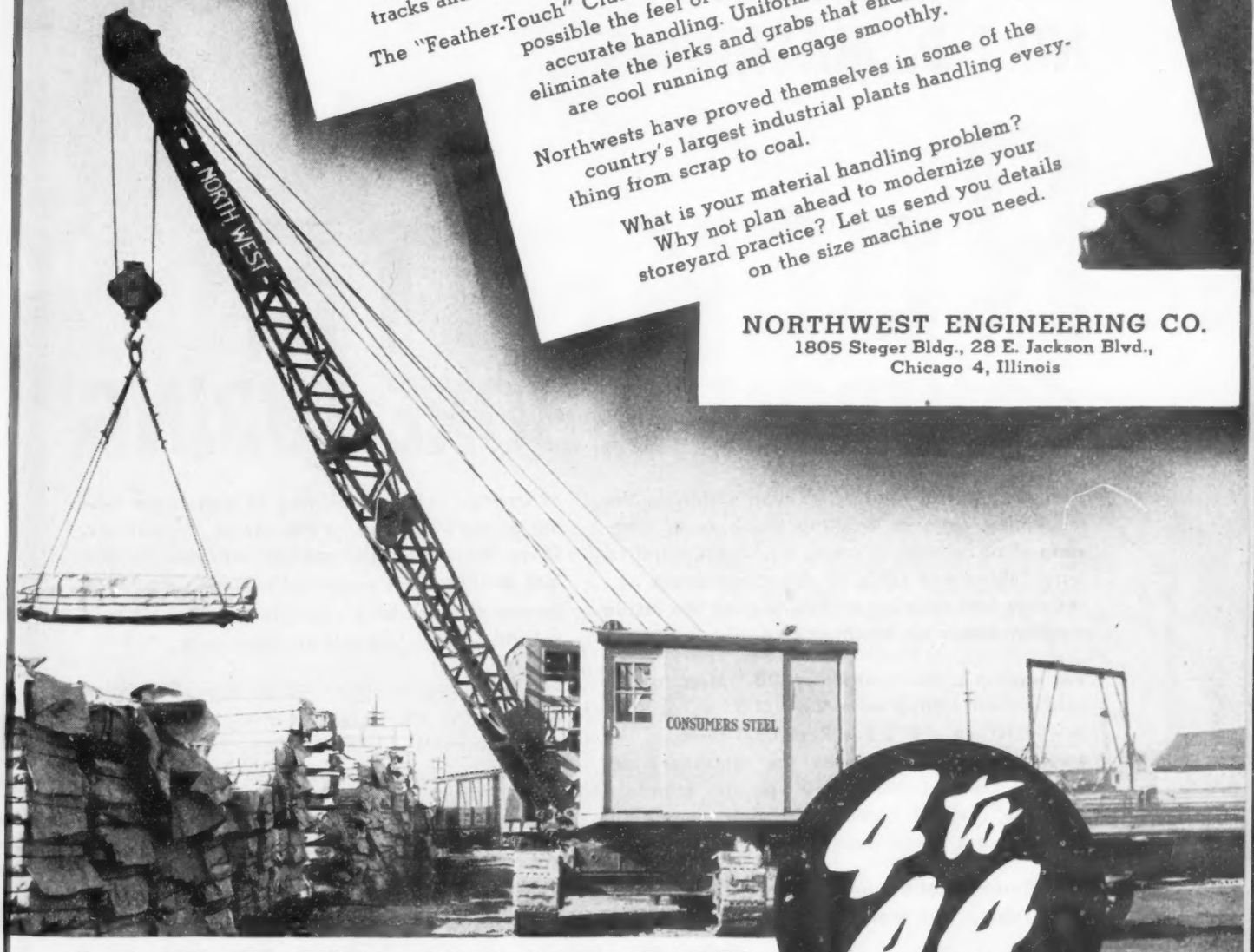


4 to 44 tons

NORTHWEST
The Crane that goes Anywhere!

FOR MINIMUM OR NO I. D. MACHINING...

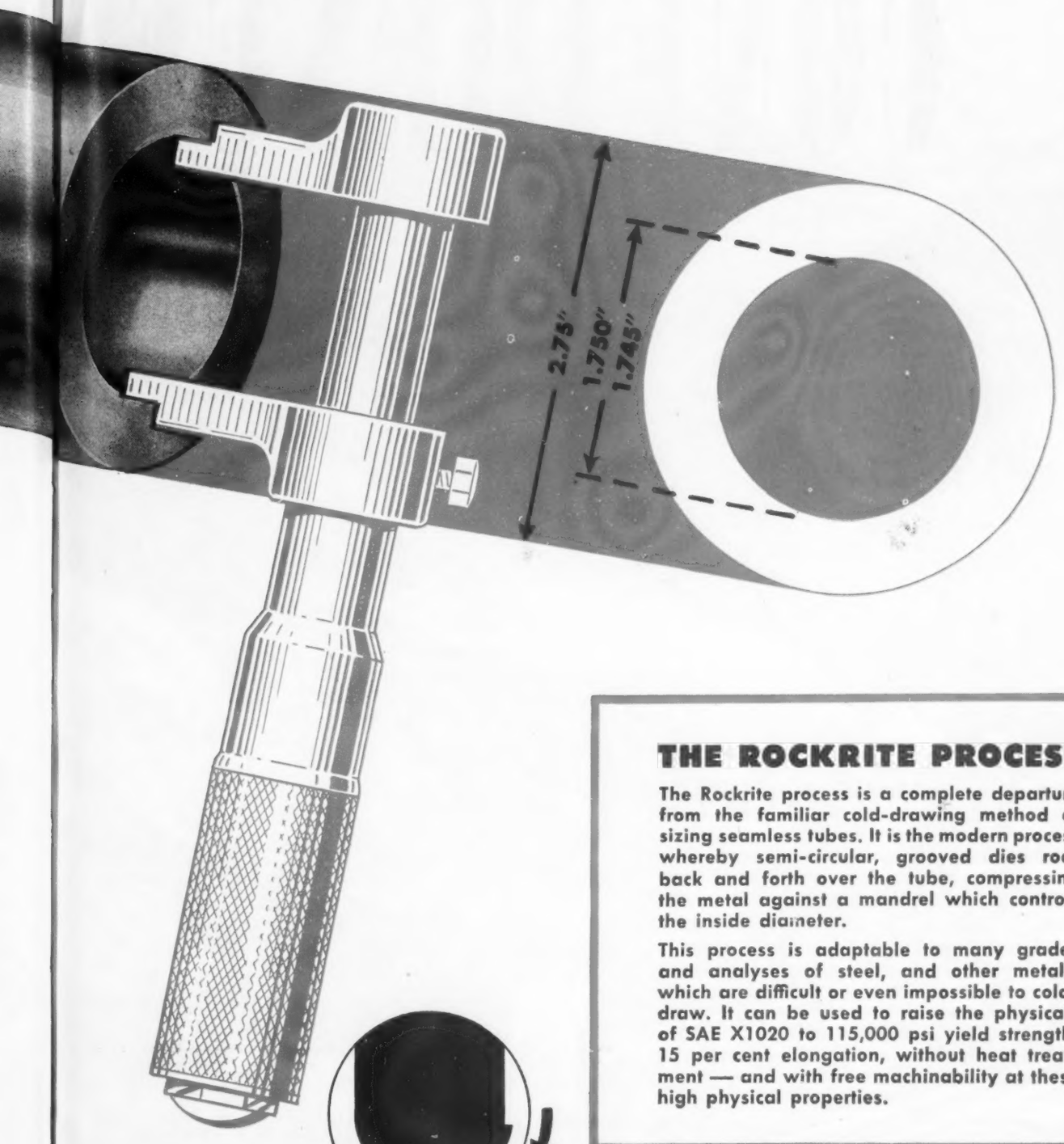
ROCKRITE
CONTROLLED BORE TUBING

Here's a way to reduce, or even eliminate the machining costs in finishing the bore of ring-shaped or cylindrical parts. Rockrite Controlled Bore Tubing has I.D.'s of *closer tolerances* . . . requires less reaming or finishing on the inside —often needs no machining at all.

For example, the customary I.D. tolerance for cold-drawn tubing with 2¾" O.D. x 1¾" I.D. is −0.010" to +0.". For Rockrite Tubing of the same nominal dimensions the tolerances are exactly half! −0.005" + 0" or this tolerance may be divided between + and − to meet special work piece requirements.

This dimensional accuracy of Rockrite Controlled Bore Tubing has made possible the same kind of savings in the machining of parts from tubing as were realized by the use of die castings. Close tolerances, plus greater concentricity and less ovality, have permitted savings up to 50% in cost of machining when Rockrite Tubing was substituted for cold-drawn tube stock.

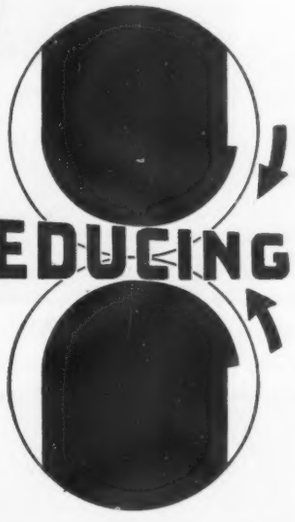
For further information about how Controlled Bore Tubing can save machining costs for you, ask for booklet "Rockrite Close Tolerance Tubing". It contains tables and charts showing comparisons of customary tube tolerances with the new tolerances obtainable with Rockrite. We will be happy to furnish detailed information applying to your specific cost-saving plans. Write today.



THE ROCKRITE PROCESS

The Rockrite process is a complete departure from the familiar cold-drawing method of sizing seamless tubes. It is the modern process whereby semi-circular, grooved dies rock back and forth over the tube, compressing the metal against a mandrel which controls the inside diameter.

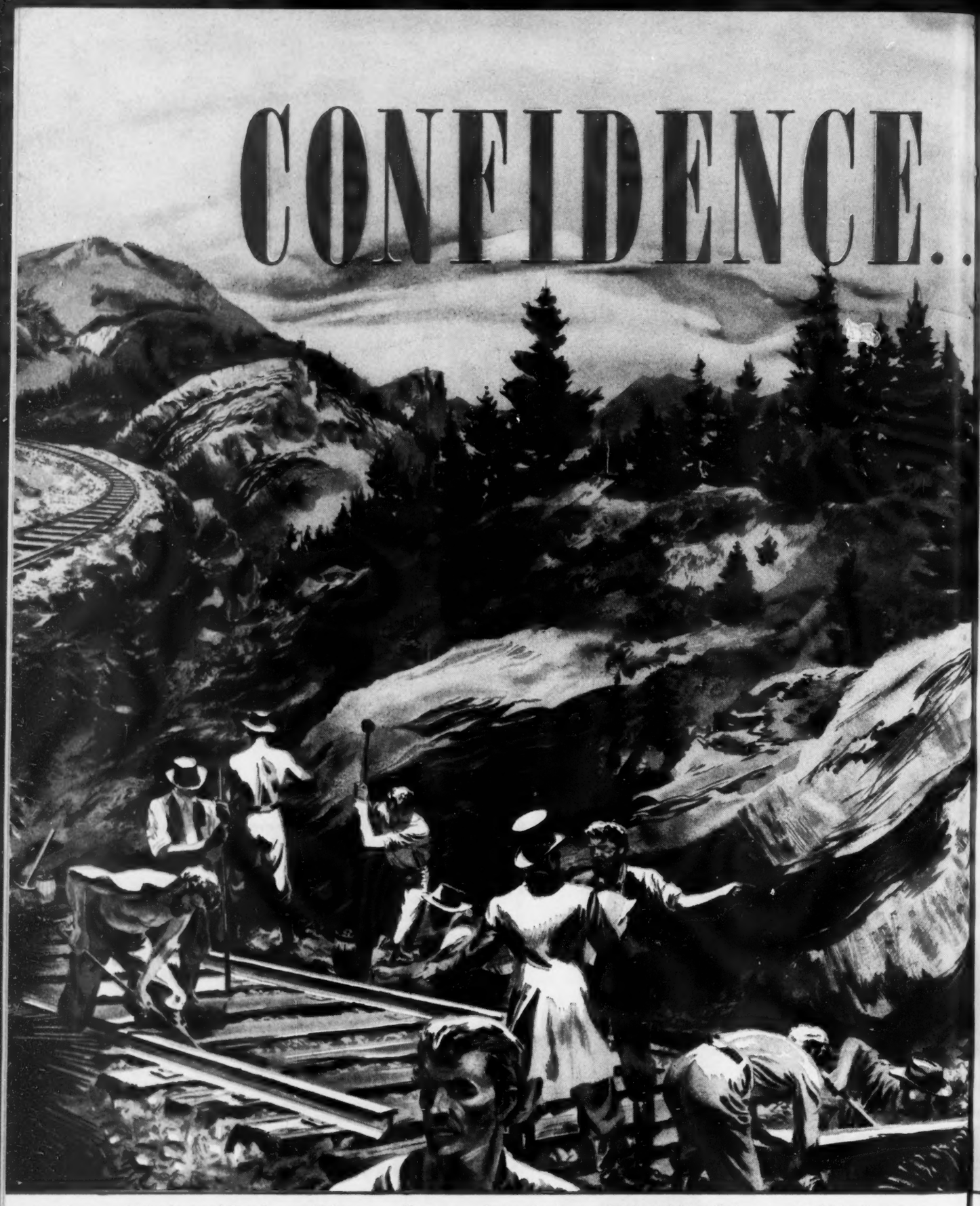
This process is adaptable to many grades and analyses of steel, and other metals, which are difficult or even impossible to cold-draw. It can be used to raise the physicals of SAE X1020 to 115,000 psi yield strength, 15 per cent elongation, without heat treatment — and with free machinability at these high physical properties.



TUBE REDUCING CORPORATION

WALLINGTON, NEW JERSEY

CONFIDENCE...



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

.....how much is it worth?

IN 1846, twenty three years before the Golden Spike was driven at Ogden, Utah marking the completion of the first transcontinental railway, John August Roebling built America's first truly practical, wire rope suspension bridge. This bridge, which carried traffic across the Monongahela River for scores of years, stood as a silent testimonial to his confidence in a principle of bridge building which, in that day, was looked upon with considerable misgiving.

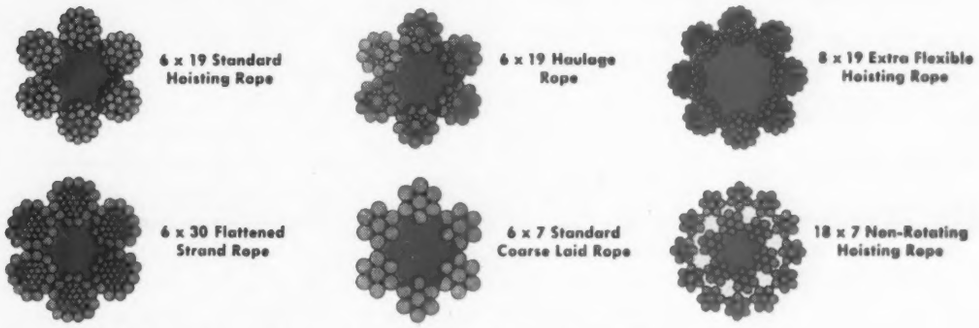
How much is this confidence worth to bridge engineers, and to humanity as a whole, today?

Had it not been for his confidence there would have been no Brooklyn, George Washington nor Golden Gate Bridges. Had it not been for your confidence in the company that bears this pioneer's name, there could have been no John A. Roebling's Sons Company.

Your confidence is valued above all of this company's assets. Every Roebling employee's job depends upon his ability to preserve that confidence by producing better products and by giving you better service than you can find elsewhere.

Any product is only as good as the organization that makes it.

FOR THE RIGHT ROPE FOR YOUR EQUIPMENT
CHOOSE A "BLUE CENTER" STEEL WIRE ROPE!


6 x 19 Standard Hoisting Rope
6 x 19 Haulage Rope
8 x 19 Extra Flexible Hoisting Rope
6 x 30 Flattened Strand Rope
6 x 7 Standard Coarse Laid Rope
18 x 7 Non-Rotating Hoisting Rope

It's easy to find the right wire rope for your job when you can choose from a wide range—the one construction, size, and grade of steel that will give you most service at lowest over-all cost.

That's why, whatever you need in wire rope, you're sure of finding it in Roebling's *complete* line of "Blue Center" Steel Wire Rope, in either preformed or non-preformed types. Illustrated are just a few of the more commonly used constructions. Each is the finest we know how to make... and each of them is made of Roebling's famous "Blue Center" Steel.

Your Roebling Field Engineer has the broad knowledge and experience needed to help you select the wire rope that will give you greatest returns in dependable, low-cost performance. He's at your service. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

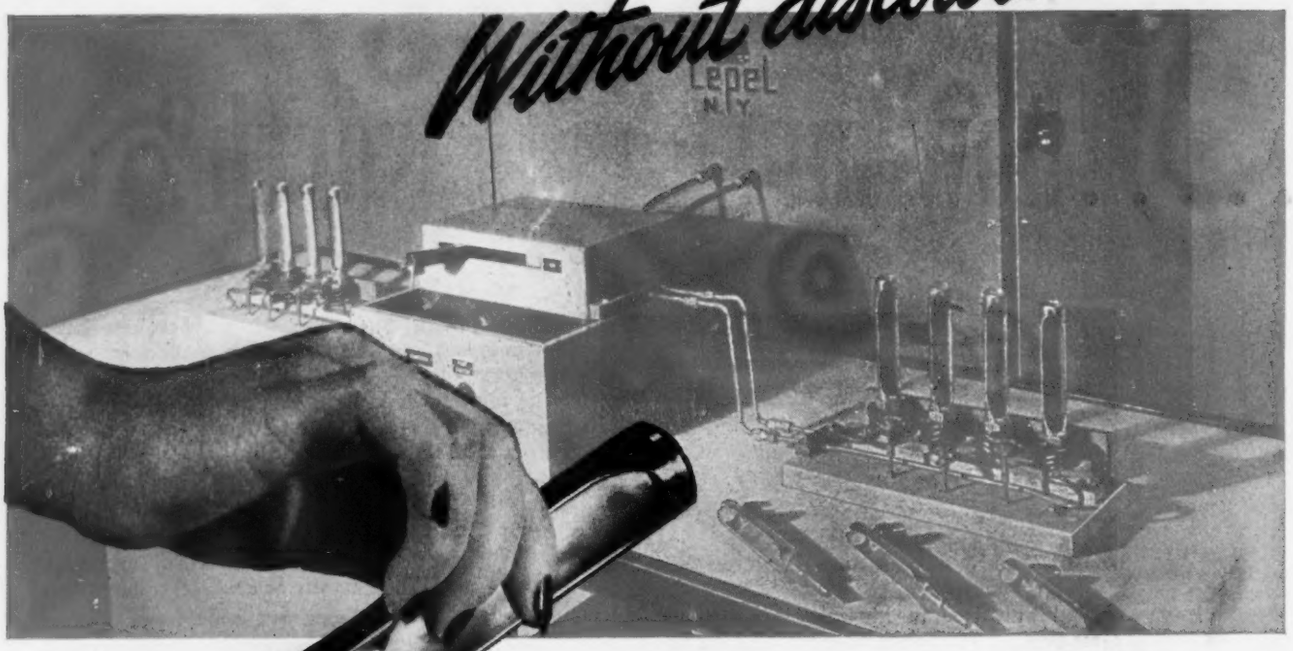
Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

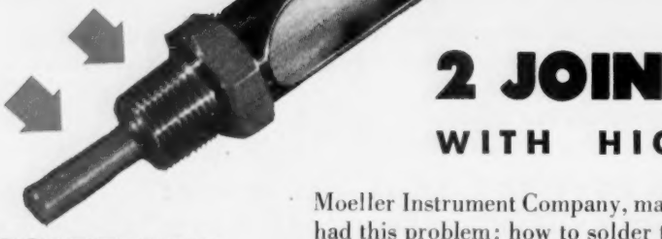
ROEBLING

A CENTURY OF CONFIDENCE

HOW TO SOLDER POLISHED BRASS

Without discoloration





2 JOINTS IN 5 SECONDS

WITH HIGH-FREQUENCY HEATING

Moeller Instrument Company, manufacturers of precision temperature-indicating devices, had this problem: how to solder two joints of this thermometer case without discoloring the highly polished brass. Solution was found in high-frequency heating, using a Lepel converter which is fully effective on non-ferrous as well as ferrous materials.

Discoloration is completely avoided by concentrating the heat quickly, exactly where needed, and in controlled amounts. Two heating operations are employed: one for the upper joint and one for the lower. With a 15-kw Lepel Converter, as used by the Moeller Company, two cases can be soldered simultaneously. Total heating time for both joints of two cases is 10 seconds — or 5 seconds per case.

A production set-up for this operation is illustrated. With a 30-kw converter, four-position load coils can be used. With pre-formed solder rings and a change-over switch, soldering can be practically continuous — 3500 or more complete cases per day per operator. No skill is required to produce perfect joints, since timing is automatic. Working conditions are clean and cool, ideal for locating on any production line.

SOLDERING
BRAZING
HARDENING
ANNEALING
MELTING

The same Lepel Spark-gap Converter will handle any or all of these processes, usually with advantages similar to those given in this advertisement. Often this unit will prove substantially more economical than any other high-frequency generator—*particularly when heating non-ferrous or non-magnetic materials.* Changing from one job to another can be done in less than 5 minutes.

If you have any operation — on ferrous or non-ferrous materials — which you think might be handled by high-frequency heating, let us make a quick preliminary investigation. If promising, our engineers can run tests, on samples you supply, and report just what can be done. There is no obligation; inquiries are treated with strictest confidence.

A letter to us will bring you, as you prefer, our latest catalog or a call by a representative. Any description of part or process which you can give may enable us to furnish, immediately, specific helpful data. You can help us by mentioning this advertisement.

HARDEN

SOLDER

BRAZE

MELT

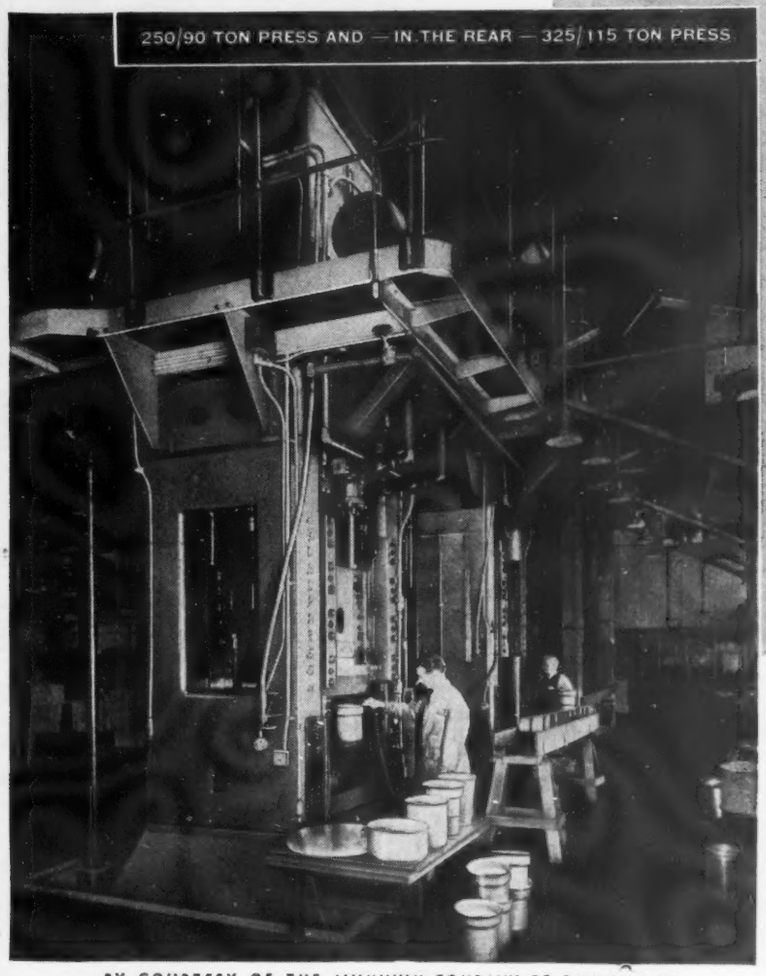
LEPEL HIGH FREQUENCY LABORATORIES

39 WEST 60th STREET, NEW YORK 23, N. Y.

HYDRAULIC DEEP DRAWING

WITH FULL OIL-HYDRAULIC DOUBLE ACTION PRESSES AUTOMATIC SELF-CONTAINED

SUPPLIED TO THE ALUMINUM COMPANY OF CANADA LTD



250/90 TON PRESS AND — IN THE REAR — 325/115 TON PRESS

BY COURTESY OF THE ALUMINUM COMPANY OF CANADA, LTD

EASILY ADAPTABLE TO SINGLE ACTION OPERATION

FOR DEEP DRAWING

OF VESSELS WITH DIFFERENT DEPTHS AND SHAPES

OF LIGHT METALS AND STAINLESS STEEL

WITH HIGHEST ADJUSTABILITY OF SPEED AND PRESSURE EASILY ACCESSIBLE QUICK SETTING OF DIES

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BY MEANS OF LIMIT SWITCHES

AUTOMATIC PRESSURE REVERSAL
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ACCURATE ALIGNMENT
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OUR PRESSES ARE CUSTOM-BUILT TO THE SPECIFIC PRODUCTION REQUIREMENTS OF EACH CUSTOMER

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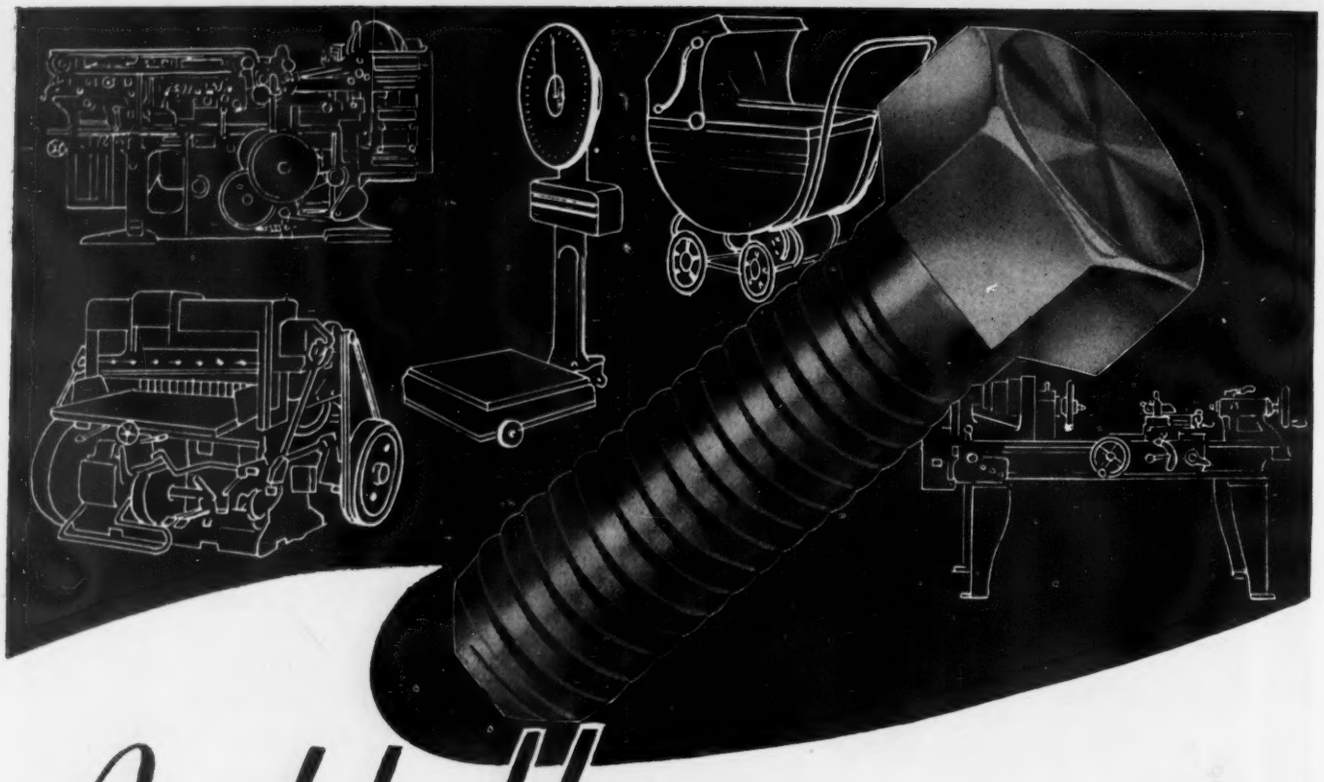


Justifiably Famous

FERRY Shinyheads

To enhance the value of your product—specify *justifiably famous* Shinyheads. They give that finishing touch, that extra sales appeal, along with extra quality.

Shinyheads are hexagon head cap screws—*Full Finished*—of high carbon C-1038 steel, with bright, shiny heads—completely machined top and bottom . . . bearing surface washer faced. Top of head chamfered . . . sides parallel and smooth, mirror finish. Threads uniform and accurate to close tolerance dimensions for perfect fit to standard gauges.

Special Note—Very Important—In addition, Ferry Cap SHINYHEADS include *all points machine turned and chamfered.*

The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD • • • • • CLEVELAND 13, OHIO

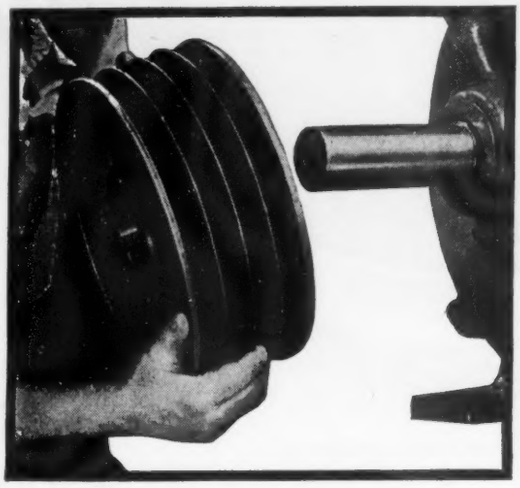
Pioneers and Recognized Specialists Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS
SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

Easy-Mounting, Fast-Locking Sheave

Pays Off

The First Time You Put It On!



"MAGIC-GRIP" *sheaves offer time-saving, money-saving features!*

EVEN if you install the sheave only once, and never change it again — it pays to get a "Magic Grip" sheave! For frequent changes, naturally, your savings pyramid.

- **No filing or reaming.** "Magic-Grip" bushing slides easily, even on oversize shafts.
- **No hammering or forcing** to damage motor bearings.
- **No wheel puller needed** to get the sheave off.
- **No set screws** to mar or score the shaft.
- **No wobble or blacklash.** "Magic-Grip" sheaves lock to shaft with shrunk-on grip.

HOW DOES IT WORK? Sheave and bushing come completely assembled. You just slip it on the shaft — align — and tighten three screws. *That's all!* And it comes off just as easily.

Standardize on time-saving, money-saving "Magic-Grip" sheaves. They're heavy duty, precision made and finely finished — the best sheaves you can buy . . . the best economy in the long run. Get them through your nearest A-C dealer or office.

ALLIS-CHALMERS, MILWAUKEE 1, WIS.

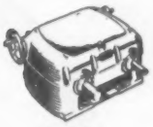
A 2166

TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

why make mountains out of molecules?

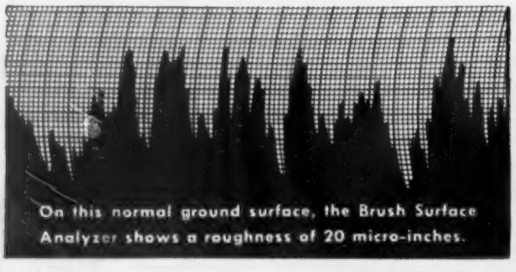
Because that's the way to learn about wear! Take a profile of a "smooth" ground surface, blow it up till millionths look like mountains—and then you see what happens to bearing surfaces.

Above is the profile recording of a normal ground surface as shown by the Brush Surface Analyzer. Those sharp ups and downs are actually the invisible grinder scratches and chatter marks that rupture oil film, opening the way to scoring and burning.

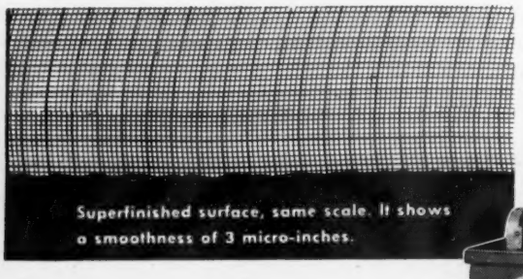
At right, below, is the Brush analysis of a *Superfinished* surface, which is seven times as smooth as the one at left. With a surface such as this, a bearing will last indefinitely.

Superfinishing is a quick, simple, inexpensive process. Not only does it pay for itself through the better service it assures, but Superfinishing can often replace other, more costly processes. Full information available on request.

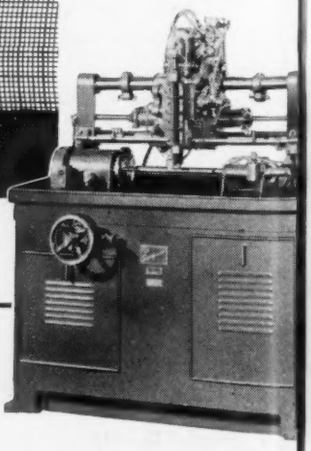
GISHOLT MACHINE COMPANY *1245 East Washington St. • Madison 3, Wisconsin*



On this normal ground surface, the Brush Surface Analyzer shows a roughness of 20 micro-inches.



Superfinished surface, same scale. It shows a smoothness of 3 micro-inches.



THE GISHOLT ROUND TABLE *represents the collective experience of leading specialists in the machining, surface finishing, and balancing of round and semi-round parts. We welcome your problems.*

Signs of the Times -

COPYRIGHT 1947, GREAT LAKES STEEL CORPORATION

N-A-X HIGH-TENSILE is synonymous with SAE 950 steel. It meets the requirements of this new SAE standard for low-alloy, high-tensile steel. It provides exceptional physical properties, proved in a wide range of applications—high strength, good formability, excellent weldability, high fatigue-resistance and impact toughness, greater corrosion-resistance. It incorporates the benefits of Great Lakes Steel Corporation's long experience in producing a low-alloy steel to meet severe fabricating and service conditions. N-A-X HIGH-TENSILE is SAE 950 at its best.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N-A-X
HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation
N-A-X Alloy Division • Detroit 18, Michigan
UNIT OF NATIONAL STEEL CORPORATION

SAFER TO WORK WITH...

Thor AIR HOSE COUPLINGS

Thor Air Hose Couplings form positively locked connections that cannot break, jar or whip apart. Tool operators prefer their simplicity . . . and the speed and ease with which they can be connected and disconnected. All sizes and combinations are interchangeable up to ¾ inches, inclusive. Each hose end is identical with the other—no right or left . . . no male or female—*a real universal coupling that fits every job.* Made of heavy, rust-resisting steel for lasting service. Call your Thor distributor for a demonstration.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. Jackson Boulevard, Chicago 6, Illinois

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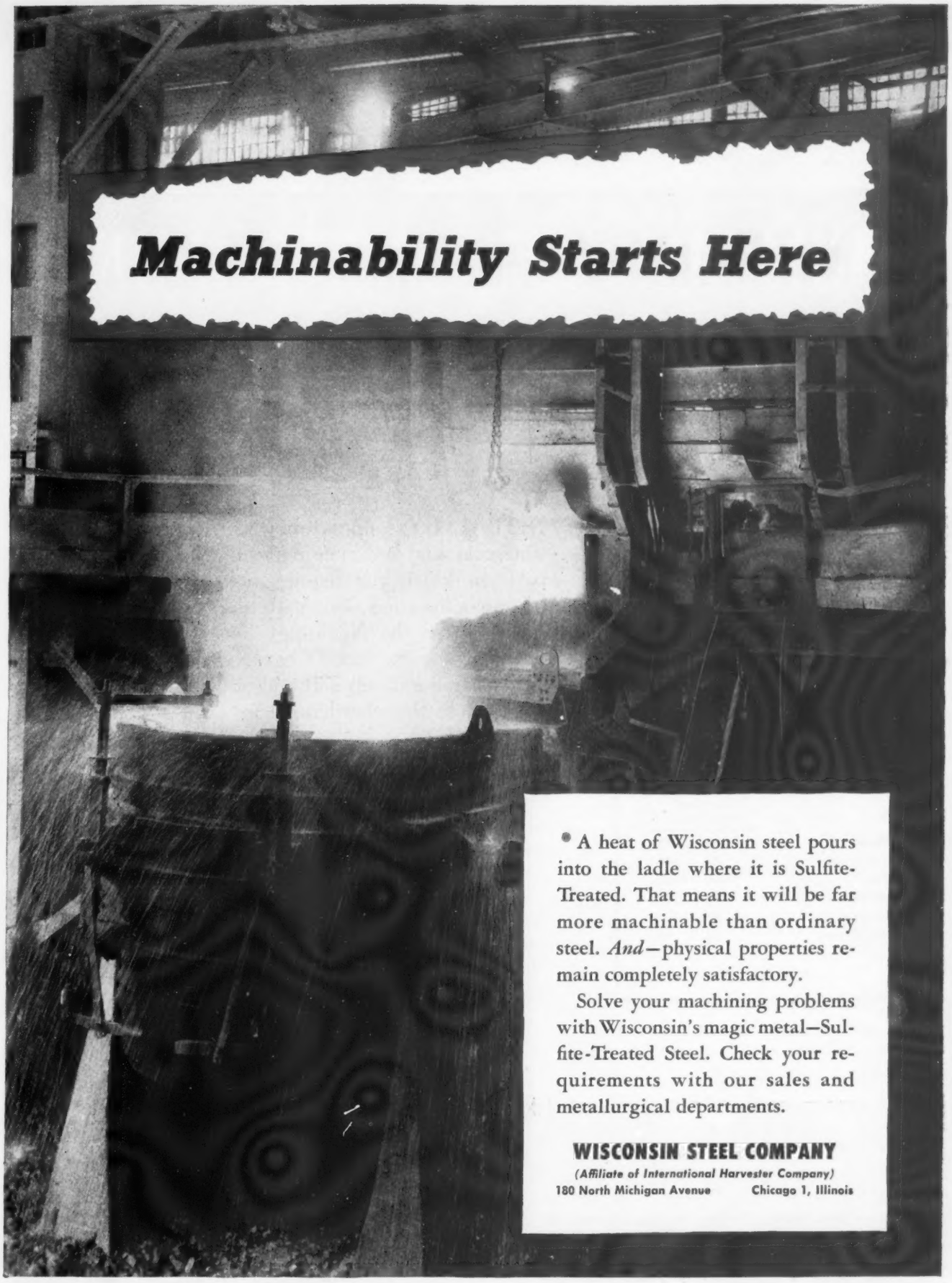
To connect, place ends together, push and twist—they snap locked.

To disconnect, simply pull back sleeves

. . . jaws open automatically.

. . . Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS



• A heat of Wisconsin steel pours into the ladle where it is Sulfite-Treated. That means it will be far more machinable than ordinary steel. *And*—physical properties remain completely satisfactory.

Solve your machining problems with Wisconsin's magic metal—Sulfite-Treated Steel. Check your requirements with our sales and metallurgical departments.

WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL

CALL ON B&W for...

NITRALLOY mechanical TUBING

...a short-cut to tough, hard parts

PROPERTIES	Nitralloy No. 135 Type "G"
Carbon	.30 — .40
Manganese	.40 — .60
Silicon	.30 — Max.
Chromium	.90 — 1.40
Aluminum	.90 — 1.40
Molybdenum	.15 — .25

	Nitralloy No. 135 "Modified" (Aircraft Spec.)
Carbon	.38 — .45
Manganese	.40 — .70
Silicon	.30 — Max.
Chromium	1.40 — 1.80
Aluminum	.95 — 1.35
Molybdenum	.30 — .45

NITRALLOY seamless tubing will save you considerable time, costs and materials in machining hollow cylindrical parts in which you require great resistance to wear, seizure or abrasion along with toughness and high durability. After the Nitriding process, Nitralloy parts combine a high surface hardness (960-1140 Vickers) with a comparatively soft and resilient inner core. They do not lose their hardened case even at temperatures up to 750F.

The unique combination of properties in this tubing make it an ideal material for making scores of different tough, hard parts...from aircraft engine liners to husky wrist pins.

Two grades of Nitralloy tubing are available for mechanical uses—135(Type G) and 135(modified). Send for complete technical data on this latest addition to B&W's wide selection of Seamless and Welded Mechanical Tubing.

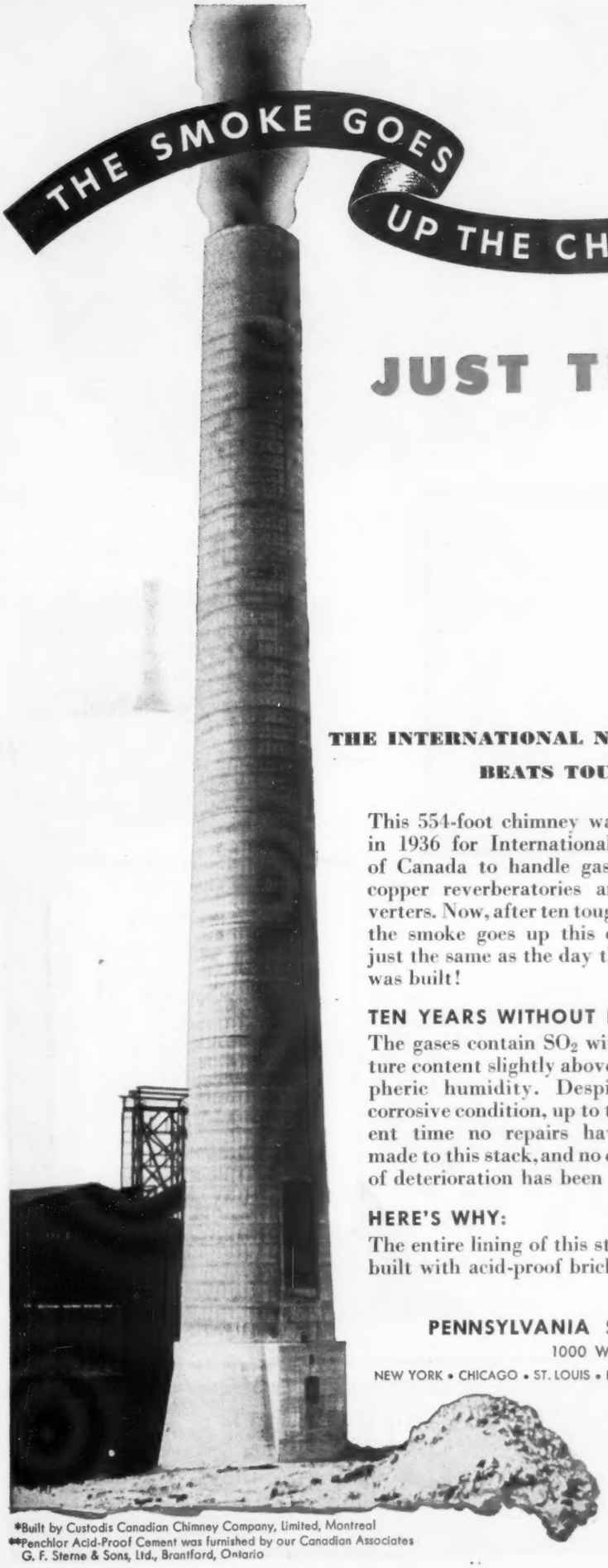
TA1399M

Other B&W Products

THE BABCOCK & WILCOX CO.
85 LIBERTY STREET • NEW YORK 6, N. Y.

Water-Tube Boilers, for Stationary Power Plants, for Marine Service • Water-Cooled Furnaces • Superheaters • Economizers • Air Heaters • Pulverized-Coal Equipment • Chain-Grate Stokers • Oil, Gas and Multi-fuel Burners • Refractories • Process Equipment

BABCOCK & WILCOX SEAMLESS & WELDED TUBES
THE BABCOCK & WILCOX TUBE COMPANY
GENERAL OFFICES: BEAVER FALLS, PA.
PLANTS: BEAVER FALLS, PA. AND ALLIANCE, OHIO.



JUST THE SAME!

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED
BEATS TOUGH CORROSION CONDITION

This 554-foot chimney was built* in 1936 for International Nickel of Canada to handle gases from copper reverberatories and converters. Now, after ten tough years, the smoke goes up this chimney just the same as the day the stack was built!

TEN YEARS WITHOUT REPAIR

The gases contain SO_2 with moisture content slightly above atmospheric humidity. Despite this corrosive condition, up to the present time no repairs have been made to this stack, and no evidence of deterioration has been noticed.

HERE'S WHY:

The entire lining of this stack was built with acid-proof brick laid in Penchlor Acid-Proof Cement.** In addition the top fifty feet of this stack was further protected by using Penchlor Acid-Proof Cement for pointing the outside surface joints. Penchlor Acid-Proof Cement is a superior sodium silicate cement that is quick-setting and self-hardening. Its outstanding record of satisfactory service has been proved in chemical plants, steel mills, paper and pulp mills, oil refineries and smelting plants.

SEND FOR CASE REPORT

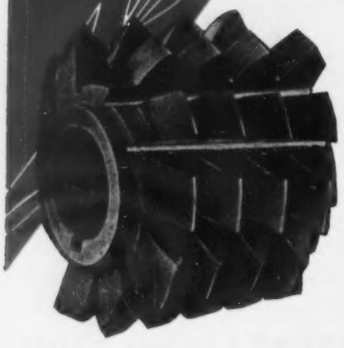
If you have a corrosion problem, you'll be interested in further details about this Penchlor installation, as well as an illustrated brochure on Penchlor. Write for Case Report Number 62-2.

Special Chemicals Division
PENNSYLVANIA SALT MANUFACTURING COMPANY
1000 Widener Building, Philadelphia 7, Pa.
NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • WYANDOTTE • TACOMA • PORTLAND, ORE.

PENN SALT
CHEMICALS
97 Years' Service to Industry

*Built by Custodis Canadian Chimney Company, Limited, Montreal
**Penchlor Acid-Proof Cement was furnished by our Canadian Associates G. F. Sterne & Sons, Ltd., Brantford, Ontario

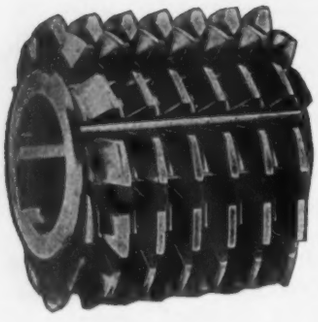
HOBS
of many
kinds
for many needs
where precision
and durability
are required



NATIONAL
CLEVELAND
TOOLS

NATIONAL Tools CLEVELAND

Cutting Tools for
All Purposes



Herringbone Cutters,
Broaches, Gear Cutters,
Gear Shaper Cutters,
Circular and Flat
Form Tools,
Form Relieved Cutters,
ground and unground,
Hobs,
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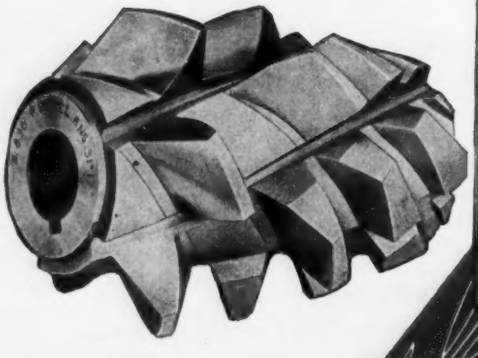
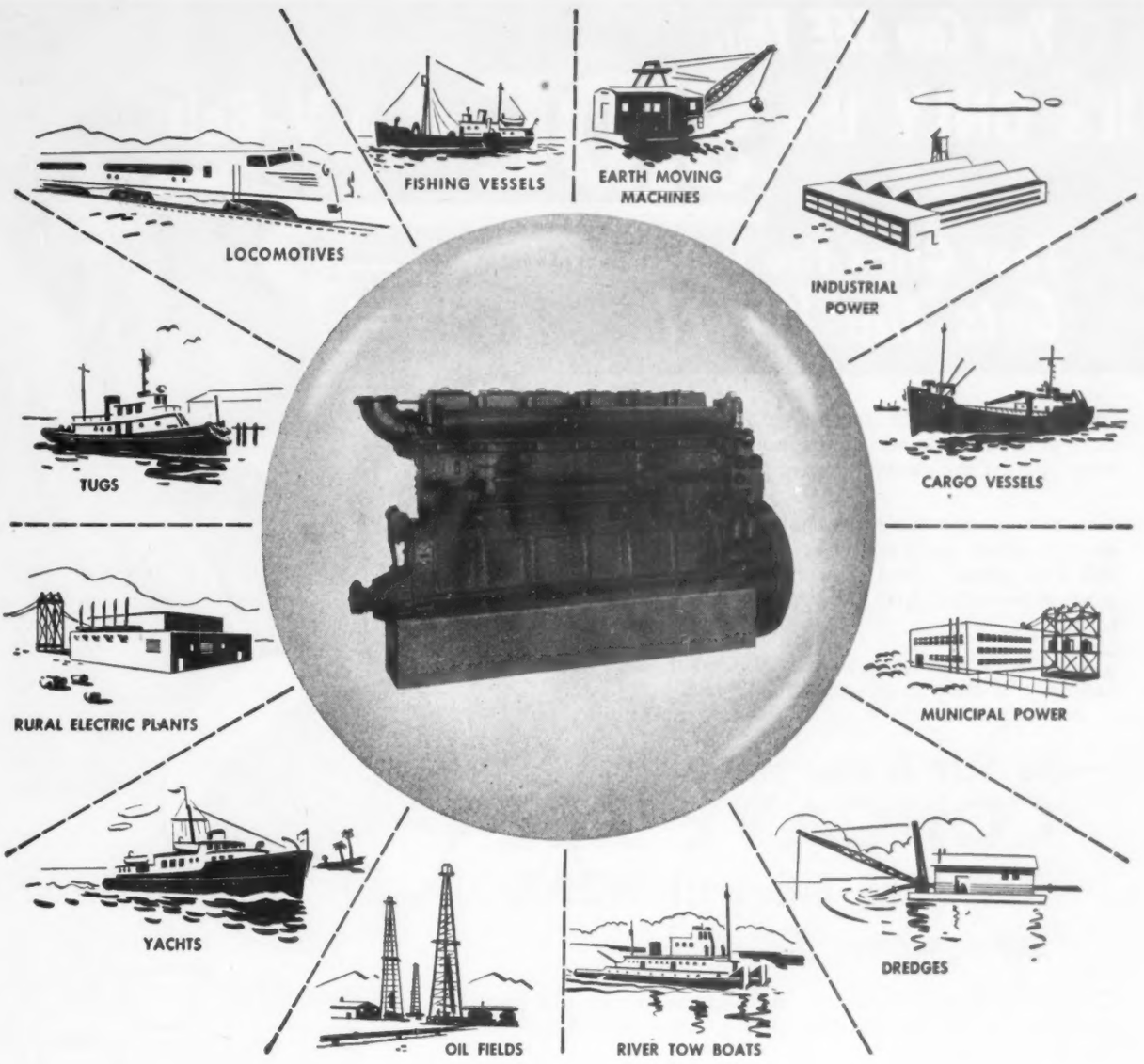
Milling Cutters,
Special Tools



NATIONAL TOOL Co.
11200 MADISON AVE
NATIONAL Tools CLEVELAND
CLEVELAND, OHIO



Speaking of "Spheres of Influence"

THE Diesel engine has a growing "sphere of influence". It extends into *many* fields because the Diesel is still the most efficient, the most economical source of power in practical use. And it promises to be for years to come.

Today, the twelve uses indicated above predominate in Cooper-Bessemer's long list of heavy duty Diesel installations. The majority of power users in these fields are "sold" on the Diesel because of its inherent economy. Hundreds are "sold" on *Cooper-Bessemer* Diesels in particular because they have experienced the *exceptional* stamina, the *above-average* performance that makes the Cooper-Bessemer name a favored one in all fields where power requirements are *rugged!*

As power needs expand, as new needs arise, as less efficient prime movers are replaced, you'll find Cooper-Bessemer always more than ready to meet the demands of progress . . . to meet *your* demands for dependable Diesel power.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington Tulsa Dallas Seattle
St. Louis Houston Los Angeles Shreveport
Calmes Engineering Company, New Orleans, La.

You Can SEE That

It's ONLY the SIDE of a V-Belt

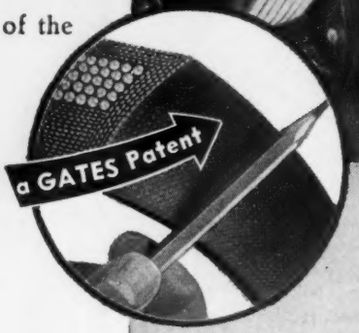
That Grips the Pulley and *Gets the Wear!*

DIAGRAM OF BELT IN PULLEY GROOVE

Look at a V-Belt in its sheave and you see at once that the *sides* of the belt do all the gripping on the pulley and get all the wear against the sheave-groove wall.

Notice, too—it's the *sides* that pick up all the power delivered by the driver pulley. The sides *transmit* that power to the *belt as a whole*. And then, once more, it's the sides—and the sides *alone*—that grip the driven pulley and *deliver* the power to it.

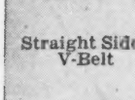
That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.



—*and Here Is How the* CONCAVE SIDE *REDUCES Sidewall WEAR *and Lengthens Belt Life!*

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.



Straight Sided V-Belt — FIG. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley — FIG. 1-A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall — FIG. 2

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley — FIG. 2-A

No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

*More Important NOW That STRONGER Tension Members are Used

Now that Gates *Specialized* Research has resulted in V-Belts having much stronger tension members—tension members of Rayon Cords and Flexible Steel Cables, among others—the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall the life-prolonging Concave Side is more important today than ever before!

THE GATES RUBBER COMPANY Denver, U. S. A.

"World's Largest Maker of V-Belts"

473

GATES VULCO ROPE DRIVES

Engineering Offices & Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

Gates — THE MARK OF SPECIALIZED RESEARCH

DEPENDABLE POWER

AND IT'S STEADY, LASTING, ECONOMICAL POWER WHEN THE BATTERIES ARE EXIDE-IRONCLADS . . .

More and more, management executives are finding that Electric Industrial Trucks, powered by Exide-Ironclads, are the *right answer* to their materials handling problem. Numerous records prove that this efficient combination assures more tons per man per hour . . . and at lower cost, which means greater profits.

Exide-Ironclad Batteries deliver continuous service day in and day out for years. They have the *high power ability* required for frequent "stop and go" service . . . the *high maintained* voltage that constant lifting, hauling and stacking demands . . . and the *high capacity* needed to assure steady, day-long performance with full shift availability.

Write us for a FREE copy of Exide-Ironclad Topics which contains "Case Studies" of materials handling problems. It tells how to cut handling costs up to 50% . . . covers latest developments in handling materials from receiving to shipping.

Materials Handling offers one of the greatest opportunities for reducing costs and increasing profits, that are available to Management today.

ELECTRIC INDUSTRIAL TRUCKS POWERED BY EXIDE-IRONCLADS HAVE ALL THESE FEATURES . . .

- Inherently dependable
- Built for long, hard service
- Provide maximum safety . . . best working conditions
- Fast handling and accurate spotting
- Effective use of lowest cost power
- Lowest overall cost

HIGHEST EARNINGS
GREATEST SAVINGS

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

Charles M. Schwab

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• The business of the Niagara Machine and Tool Works was built on a foundation of steel. One of the distinguished builders of the steel industry was Charles M. Schwab,—*a great name in steel.* The expression "Made in U. S. A." could well be amplified to say "MADE OF STEEL IN U. S. A." Countless products contributing to better living of men, women and children everywhere are made possible... made better... made more economically by being made of sheet steel on Niagara Presses and Shears. Men responsible for production are invited to learn about the design and performance of Niagara machines.

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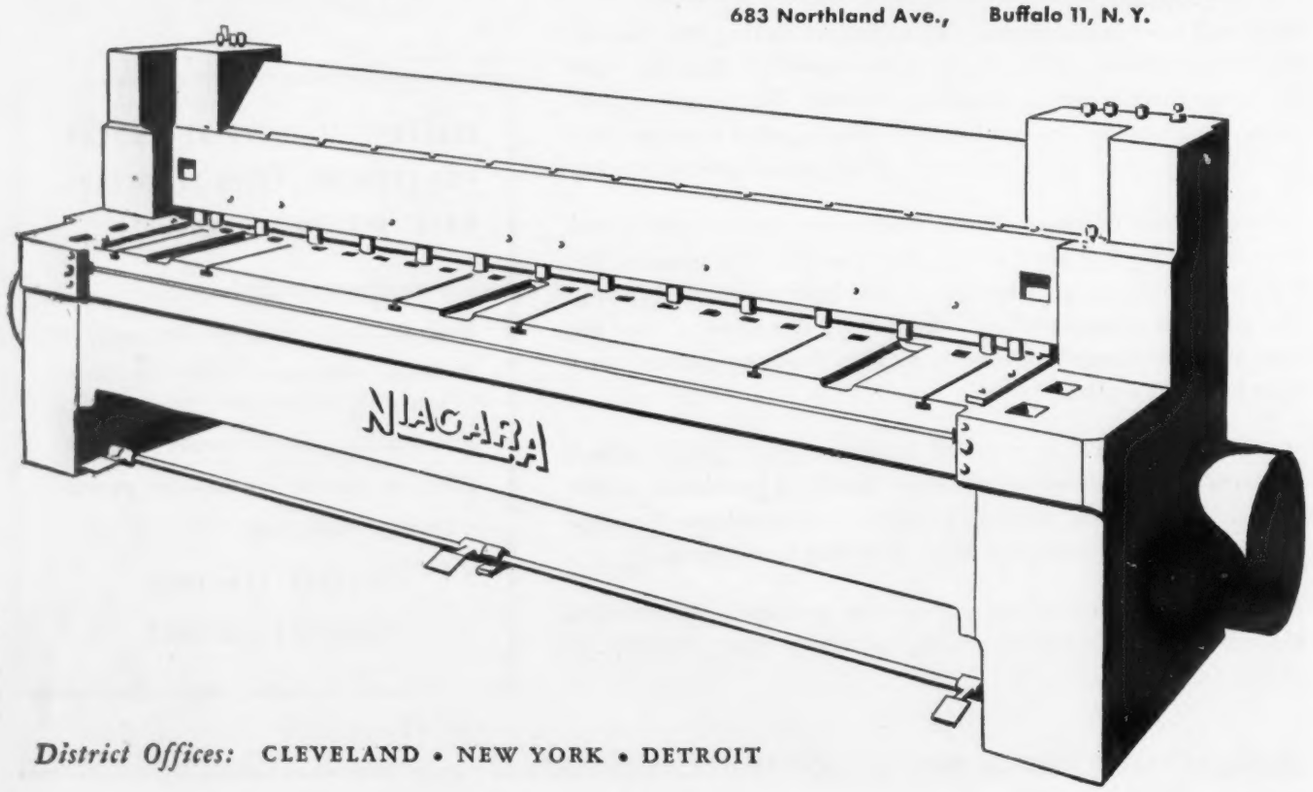
683 Northland Ave., Buffalo 11, N. Y.



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The Vital Element in the IMPROVEMENT of Metals by Forging ... is MEN!

Micro examination of the metal structure of steel in billet or bar indicates whether or not the physical structure of steel for a forging is as specified. Micro examination of finished forgings reveals the exact degree of improvement of physical structure that has been wrought by the forging process.

Quality in forgings is not obtained *merely* by properly matching men, materials and machines. Quality in forgings is the evidence of conscience-governed activity—of persistent adherence to fixed standards for performing every act of craftsmanship. By the correct combination of highly skilled craftsmen and Steel Improvement forging techniques, the maximum development of metal quality is obtained in forging wrought metals.

Fortified by over 34 years of experience in forging intricate designs, and by specialized metallurgical and engineering skill thus acquired, Steel Improvement Forging Engineers and Metallurgists: (1) know the exact forging technique that should be utilized for developing fully the qualities, inherent in a specific grade of steel, that are required to meet the stresses occurring in a specific service condition; (2) advise and assist designers regarding the correct placement of parting lines and other design elements having an influence on quality and cost; and (3) adhere strictly to a policy of projecting a promise of quality and delivery only when such promise can be substantiated by fact or experience, or both. Consult a Steel Improvement Forging Engineer about forging so-called "impossible-to-forge" designs and the measure of quality in forgings, you require.

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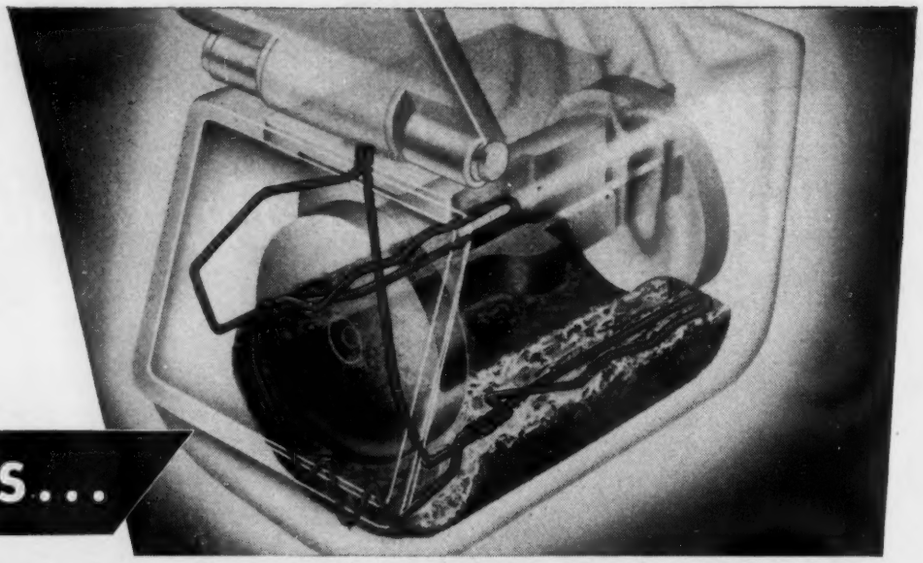
Write for reference booklet titled "The Improvement of Metals by Forging", which has been prepared especially for executive engineers, designers and metallurgists.

DROP, UPSET AND PRESS FORGINGS FROM A FEW OUNCES TO 500 LBS. OF ALL FORGEABLE METALS



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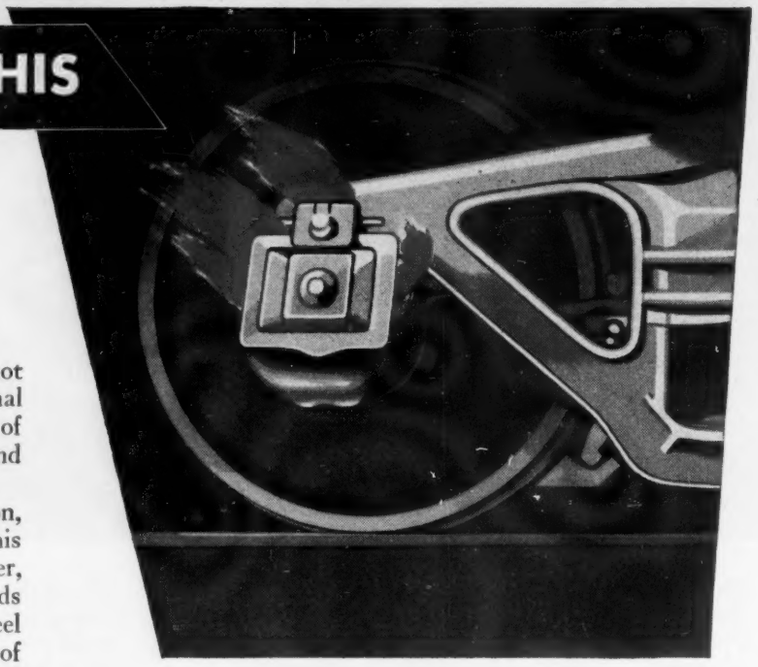

Helps prevent THIS

Another important application of steel spring wire

ONE of the headaches of railroading is "hot boxes" . . . caused by failure of journal lubrication. And one of the principal causes of lubrication failure is displaced packing and waste grabs.

Our customer, Spring Packing Corporation, Chicago, Illinois, has successfully solved this problem by developing a packing retainer, fabricated at low cost from one of the thousands of types of steel wire made by American Steel and Wire Company. More than two million of these retainers are now speeding service and avoiding lubrication troubles on 75 railroads.

Not only in railroading, but in hundreds of other industries, products made of American steel wire are doing important jobs . . . wire forms, springs, reinforcements, stiffeners, framing, to name just a few. Our engineers are always ready to consult with manufacturers in the design and fabrication of such products. Simply write to American Steel and Wire Company, 412 Rockefeller Building, Cleveland 13, Ohio.

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USS AMERICAN MANUFACTURERS WIRE UNITED STATES STEEL

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You'll find an economical solution to your intraplant haulage problem in the complete line of Plymouth Locomotives. Write today for complete information . . . Plymouth Locomotive Works, Dept. A-1, Plymouth, Ohio.

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Specify MO-MAX HIGH SPEED STEELS for your...

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4. MO-MAX is available in a standardized composition; also in cobalt and high vanadium varieties for special high speed steel requirements.
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Learn all the facts! **Send for your copy of the MO-MAX Handbook, sixth edition. Get the full story about this remarkable steel, including easy-to-follow instructions on heat treating.**

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Buyer's Guide to Brands of MO-MAX

"LMW"	Allegheny Ludlum Steel Corporation
"MOHICAN"	Atlas Steels Limited
"BETHLEHEM HM"	Bethlehem Steel Company
"MO-CUT"	Braeburn Alloy Steel Corporation
"STAR MAX"	Carpenter Steel Company
"MOLITE M-1"	Columbia Tool Steel Company
"REX T-MO"	Crucible Steel Company of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Halcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Company
"MIDMAX"	The Midvale Company
"S. T. M."	Simonds Saw & Steel Company
"MO-TUNG"	Universal-Cyclops Steel Corporation
"8-N-2"	Vanadium-Alloys Steel Company
"VUL-MO"	Vulcan Crucible Steel Company

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A LITTLE BIT OF ARSENIC in wine is poison . . . in the industrial arts and printing field it is man's servant.

Unwanted alloys . . . copper, nickel, chrome, etc. in small quantities can ruin a heat of steel. Alloy scrap properly segregated by Industry and Dealers prevents contamination—insures quality steel products—conserves reserves—adds value to your scrap return.

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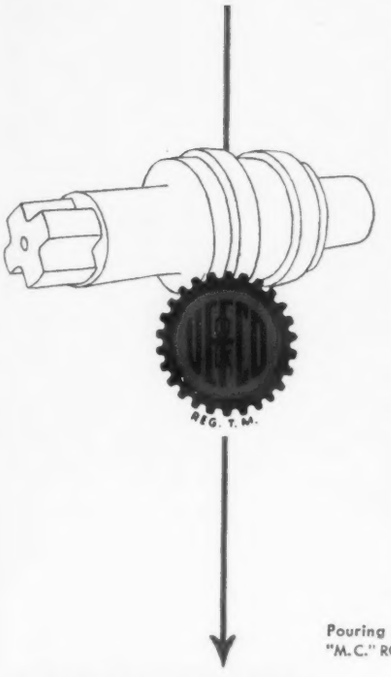

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UNITED... *Announces* the NEW * "M.C." ROLL

(Identified by Dark Blue Wabbler)

One of the most difficult to obtain and yet highly desired specifications demanded of a maker is to produce a roll with sufficient wear resistant depth for deep section rolling, and for finishing and semi-finishing work on bar mills and rod mills.

UNITED has satisfied this demand by the development of the "M.C." Roll, a truly *Master Chilled* Roll with a chill that *shows no mottle* at any reasonable working depth. Combined with the desired feature of depth, "M.C." Rolls, through special alloying and a carefully controlled melting practice, give the user added assurance of strength and long service life.

"M.C." Rolls are made in one grade only. The hardness range is from 60 to 65, and *this hardness structure is maintained through the entire working depth.*

"M.C." Rolls are a proven product—an answer to the demand for rolls with deep chilled structure and strength, especially in the small and medium diameter range.

Specific recommendations for their application will be gladly furnished at your request.

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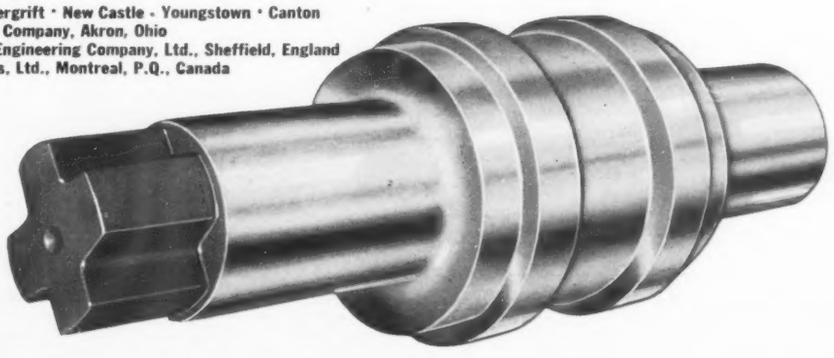
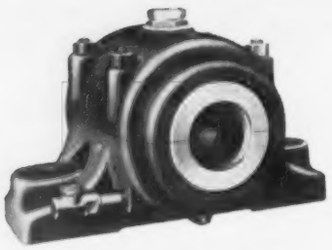
The 16 principal classifications comprising the UNITED ROLL LINE . . . each one a roll type successfully used in modern industry . . . are individually and distinctively *color-branded* to designate *type, composition* and *service application.* Roll selection is thereby made easy and accurate.

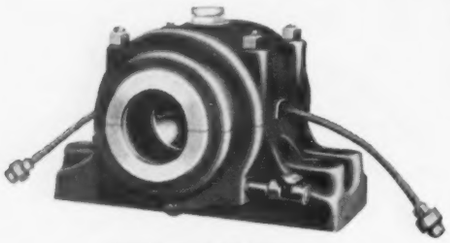
UNITED ROLLS are the product of advanced metallurgical research and more than 40 years experience in roll design and manufacture.





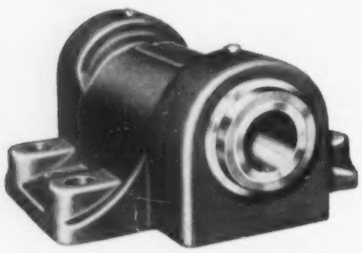
SLEEVOIL PILLOW BLOCK

A precision-built, ring-oiling babbitted bearing, self-aligning and exceptionally quiet. Special seals prevent oil leakage and keep dirt out. Field-proved by thousands of installations.



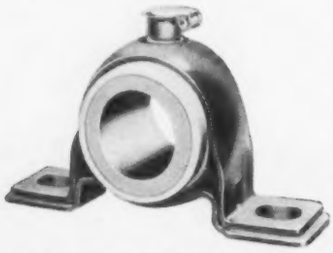
WATER-COOLED SLEEVOIL PILLOW BLOCK

Designed for applications where higher temperatures are encountered. Shaft sizes from 1-11/16" to 8". Widely used under industry's toughest operating conditions.



DH BALL BEARING FAN AND BLOWER PILLOW BLOCK

Single row, deep groove ball bearings for No. 2 arrangement. Inner race extended to form sleeve which carries shaft. Piston ring seals retain lubricant, exclude dirt. Shaft sizes 15/16" to 2-1/4". A favorite where compactness is at a premium.



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Capillary bronze bushing has capacity of one-third its volume in oil. Reservoir with close fitting wick around bushing provides ample lubrication. Oil resistant and static proof grommets available for noise isolation. Sizes 1/2" to 1-1/4". America's standard for light applications.

FAN AND BLOWER BEARINGS

America's Most Complete Line

Working closely with air conditioning equipment manufacturers, Dodge of Mishawaka has developed bearings to meet the exacting operating conditions encountered in this industry. Cost-saving products for the mechanical transmission of power are manufactured by Dodge for use in all industries.

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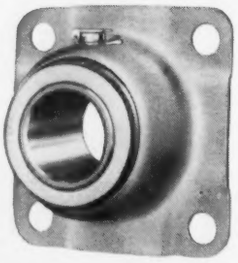

BRONZOIL FLANGED BEARING

Mounted in heavy gauge steel flanged housing this bearing has the basic Bronzoil construction and characteristics as described at the left. Sizes 1/2" to 1-1/4". A proven performer in a new mounting.

CALL THE TRANSMISSIONEER

your local Dodge distributor, for information about the line of Dodge bearings for fan and blower service—and for news about Dodge products to cut costs and increase production in all industries. Look for his name under "Power Transmission Equipment" in your classified phone directory.

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NAME PLATES

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INSTALL STEEL PIPING ADEQUATE FOR TOMORROW'S NEEDS

He's spending extra dollars now.... ..to save big money on pipe later

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So, today, this man is saving money by spending. He's doing some forward-planning--thinking in terms of what he will need later on, not of the minimums he can get by with today.

It's only common sense to look ahead when it comes to investing in equipment as permanent as steel pipe. Yet too few people do it! And it certainly is long run economy to install pipe that's adequate to do a job for today AND TOMORROW TOO.

Distributors in all industrial markets handle Youngstown pipe in a wide range of sizes.

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Plymetl

The material that's making news today

For over twenty-five years, Plymetl — a Haskelite material — has helped designers and engineers build greater performance, durability and sales appeal into their manufactured products. Its use eliminates deadweight, and makes complicated framing members and fastenings unnecessary. There is only one Plymetl . . . Haskelite Plymetl . . . with its performance proved. A material of many advantages, Haskelite Plymetl is easily worked with simple metalworking or woodworking tools. It can often save man-hours to a point where the final cost of the product may be noticeably reduced. The unique strength and weight characteristics of Plymetl are graphically described in the chart below. Write for complete data and samples of Plymetl.

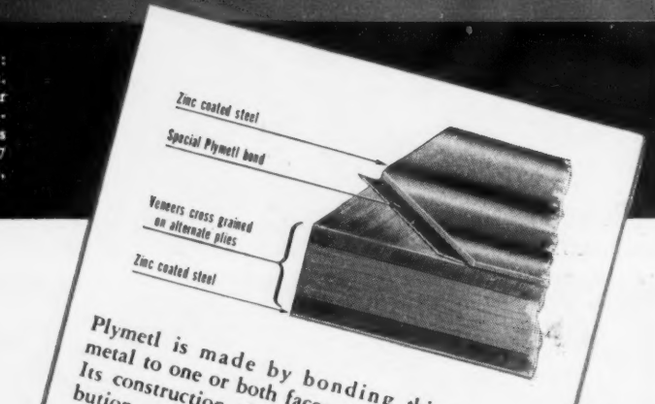
	PLYMETL UVU			STEEL U.S. STD. GAUGES			ALUMINUM B & S STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	16 ga.	12 ga.	10 ga.	8 ga.	6 ga.
Weight in lbs. per sq. ft.	1.01	1.17	1.43	1.5	2.5	4.37	1.44	1.81	2.28
Stiffness factor E I in.^{2} lbs.	4,900	8,400	13,200	124	575	3,050	872	1,760	3,500

	PLYMETL EVE			STEEL U.S. STD. GAUGES			ALUMINUM B & S STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	16 ga.	12 ga.	10 ga.	8 ga.	6 ga.
Weight in lbs. per sq. ft.	2.25	2.40	2.56	1.5	2.5	4.37	1.44	1.81	2.28
Stiffness factor E I in.^{2} lbs.	17,000	28,000	43,000	124	575	3,050	872	1,760	3,500

In the chart above, note that a 5/16" EVE Plymetl panel (zinc-coated steel two sides) weighs 2.40 lbs. per square foot. This is less than the weight of 16-gauge steel. However, the resistance to bending of the Plymetl panel is about 30 times as great!

Where rigidity is of prime importance, consider the following: A 3/8" UVU Plymetl panel (aluminum two sides) weighs 1.43 lbs. per square foot. The weight of 20-gauge steel is 1.5 lbs. per square foot. The Plymetl panel, though lighter in weight has 100 times the stiffness of the sheet steel.

In computing the values of Plymetl, the following is assumed: (1) The modulus of elasticity of steel, 30,000,000 lbs. per sq. in. (2) The modulus of elasticity of aluminum, 10,000,000 lbs. per sq. in. (3) The modulus of elasticity for the core material, 1,300,000 lbs. per sq. in. along the grain, 65,000 lbs. per sq. in. across the grain. (4) The thickness of steel and aluminum, .021" (27 ga.) and .015", respectively. (5) The weight of plywood plaque, 30 lbs. per cu. ft.



Plymetl is made by bonding thin sheets of metal to one or both faces of a plywood plaque. Its construction effects the most efficient distribution of these materials, combining high strength qualities of the metal surfaces with low density of woods. Result: Plymetl makes an ideal structural material, simulating an I beam with the metal surfaces taking the part of the flanges and the light weight plaque acting as the web.

Write for complete data and samples.

HASKELITE

MANUFACTURING CORPORATION

Dept. S, Grand Rapids 2, Mich.

NEW YORK CHICAGO DETROIT CLEVELAND
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Canada: Railway & Power Engineering Corp. Ltd.

alchemists did **not** have GAS

Illustration from The Bettmann Archive

Even without GAS, essential productive fuel of industry, the alchemists laid the basis for modern chemistry—set the pattern of research for generations of scientists who followed them.

These modern scientists have produced miracles of which the ancients never dreamed. Not gold, of course, but—more precious than the alchemist's gold—the wonders of chemistry, metallurgy, physics, electronics, medicine. Fortunately, these researchers have GAS at their command. They depend on GAS for the exact modulations of heat required to produce chemical and physical changes.

Out of the laboratories, these modern miracles become the articles of commerce. In the production processes of thousands of industries GAS and modern Gas equipment duplicate their essential laboratory functions. Among available heat sources, the characteristics of GAS make it the ideal heating medium:

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- **Dependability**
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- **Cleanliness**
- **Flexibility**
- **Efficiency**
- **Simplicity**
- **Versatility**

The Industrial Representative from your local Gas Company will bring you up to date on miracle-working GAS for your production processes.

AMERICAN GAS ASSOCIATION

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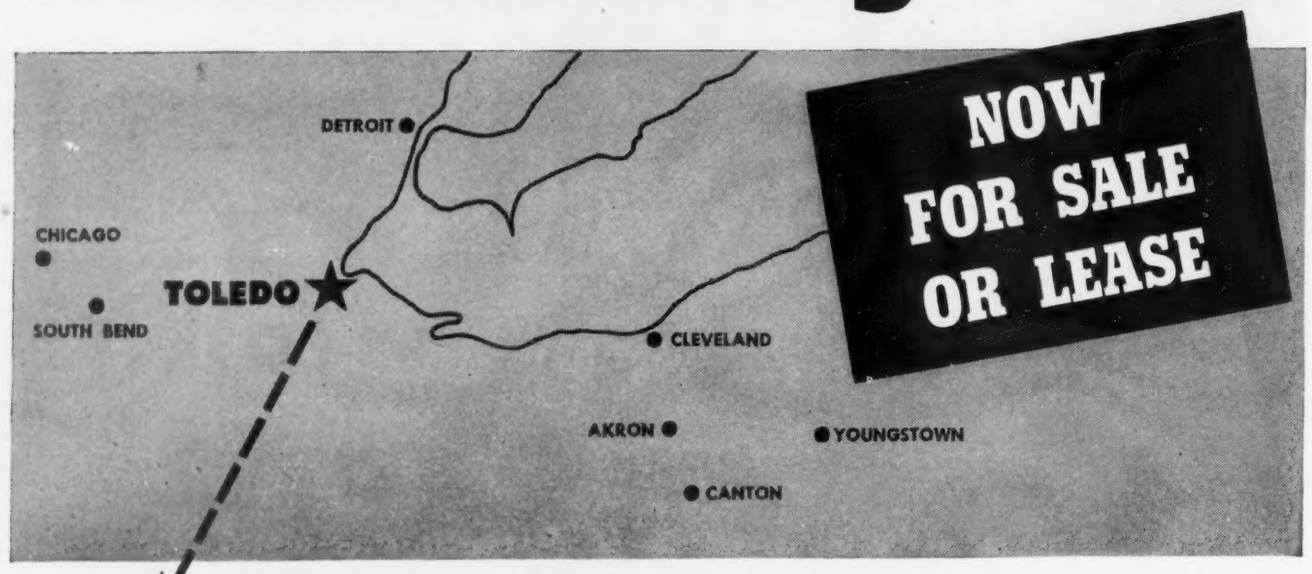
MORE AND MORE...

THE TREND IS TO GAS

FOR ALL INDUSTRIAL HEATING

Manufacturing Plant



AT ★ TOLEDO WITHIN THE HUB OF THE NATION'S GREAT INDUSTRIAL AREA

- **Location well-suited to many types of manufacturing needs.**
- **Adaptable to small tool parts production.**
- **Two sidings connecting with New York Central Railroad, run the length of the building.**

Written proposals in triplicate for purchase or lease of this plant will be received by the War Assets Administration until 4:00 P.M., (E.S.T.), May 20, 1947, at which hour all proposals will be publicly opened and read at the Regional Office listed below.

Proposals not personally delivered at that office should be mailed to: "War Assets Administration, Office of Real Property Disposal, P. O. Box 6432, Cleveland 1, Ohio."

Proposals should be submitted on Uniform Bid Forms, available at the Cleveland Regional Office, which give the terms and conditions of this offer. Transfer of title to this facility shall contain provisions in the interest of National Security.

Information on how to make a proposal and how to obtain credit may be obtained from any War Assets Administration Regional office. Use of lessee's name is for identification only and has no connection with lessee's own facilities. Priority for purchase may be arranged for qualifying small business.

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BUILDING: Three stories and basement, total floor area of some 350,000 sq. ft. of reinforced concrete and brick construction recently modernized. Four freight elevators —incandescent and fluorescent lighting.

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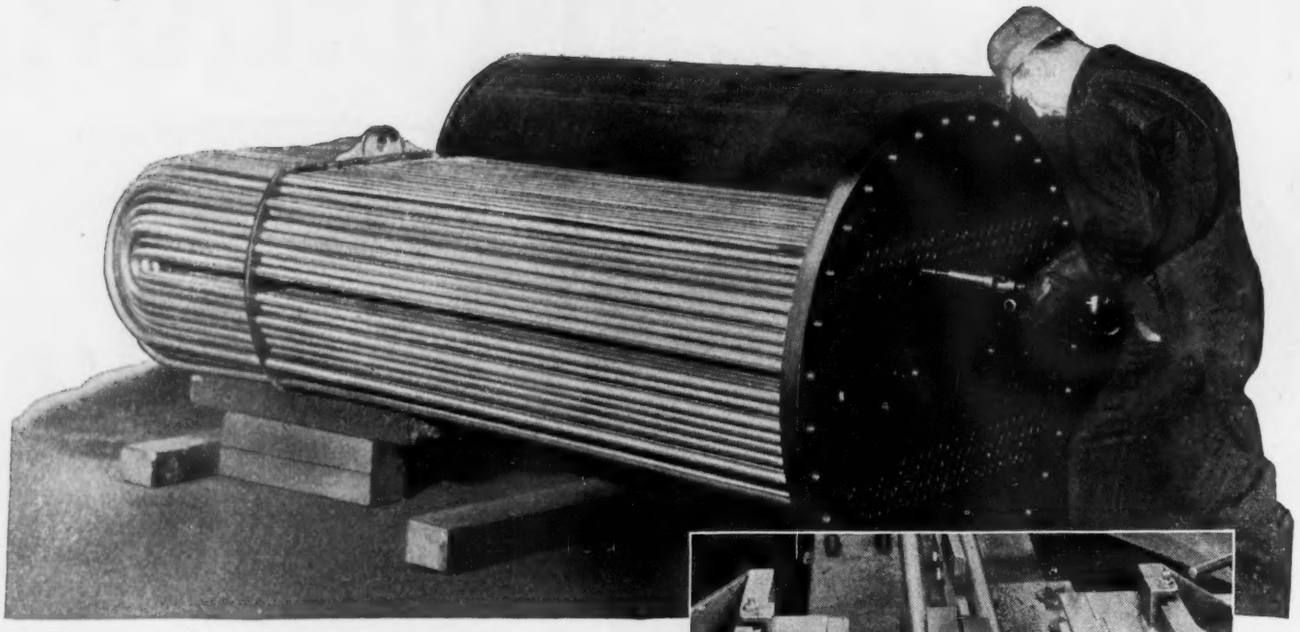

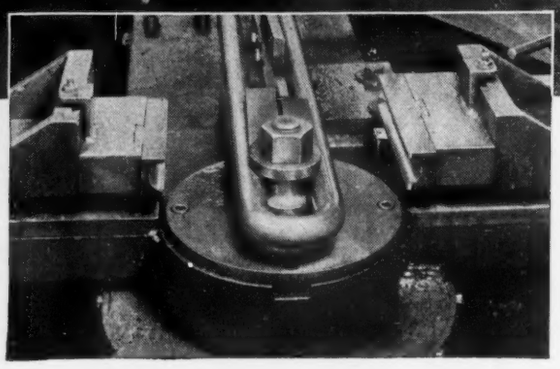

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Note the unusually tight return bends in this heating coil unit. The tubes are tough, corrosion resistant stainless steel, yet the inside bend is only 1½" mean radius—on a 1¼" O.D. x 16 ga. tube!

It wasn't done without difficulty. The tube is bent on an automatic machine with ball-type mandrel. Trouble was, the ball, after only a few bends, picked up a heavy burr. Then, on a tight return, the tubes would invariably chatter, sometimes break. Worse yet, constant redressing of the ball reduced its size—on larger bends, the extra clearance made tubes wrinkle.

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fittings
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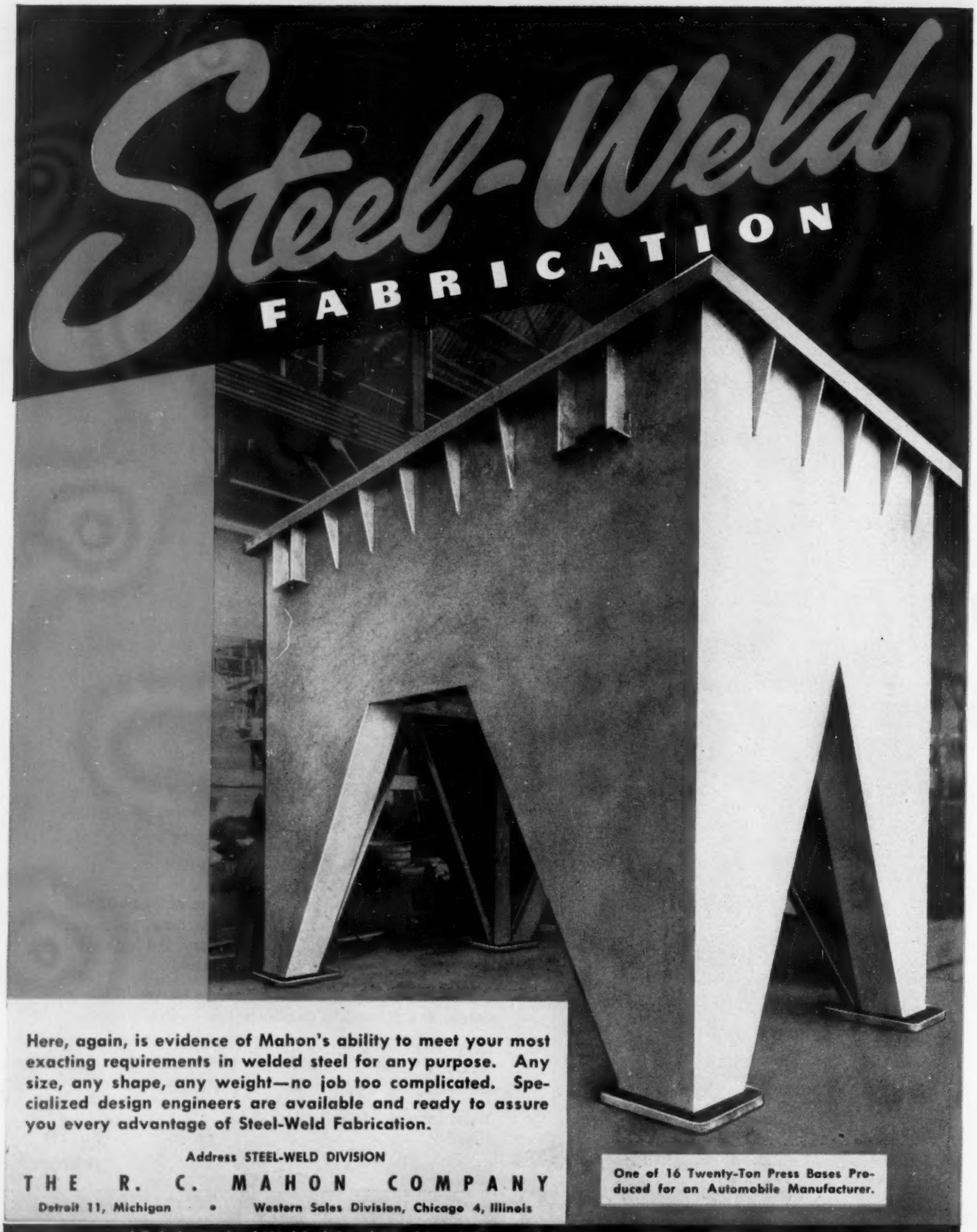

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Brazing Simplifies Casting Designs
Minimizing Motor Reversing Time
Safety Plan with Forceful Follow-Up

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The Magazine of Metalworking and Metalproducing

VOL. 120, NO. 13 MARCH 31, 1947

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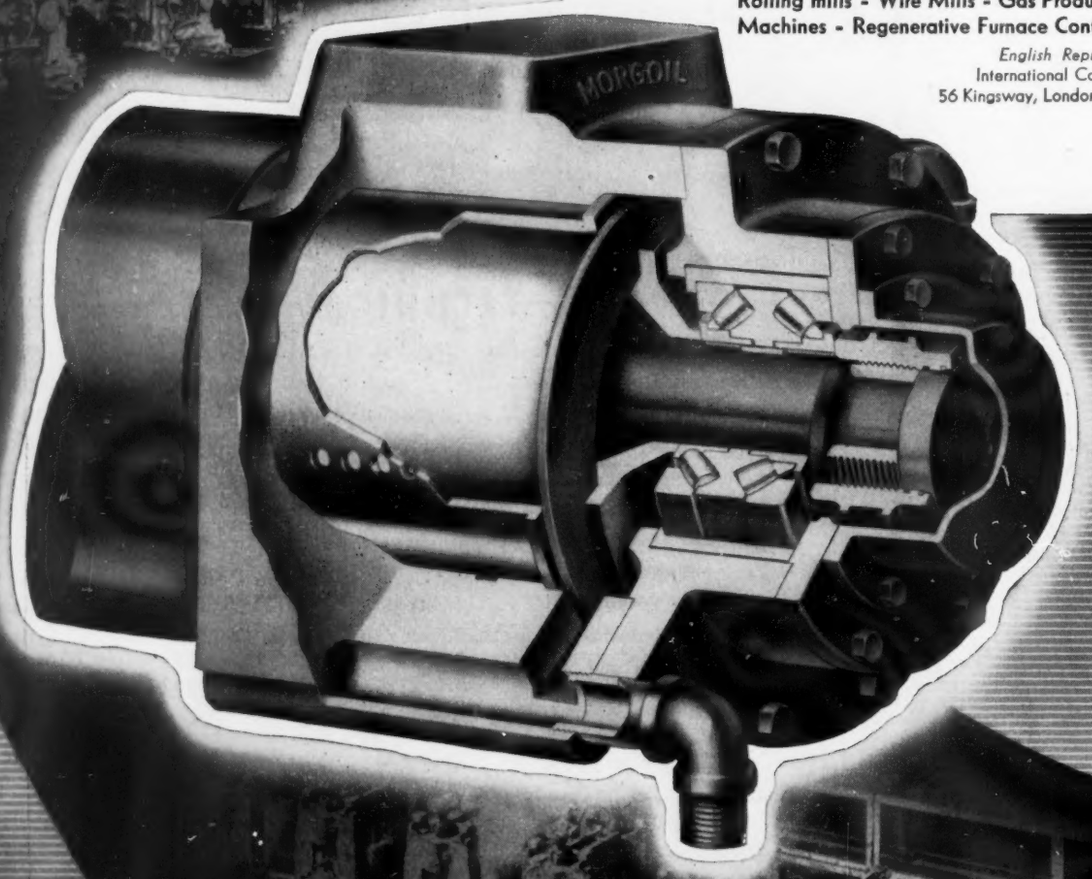
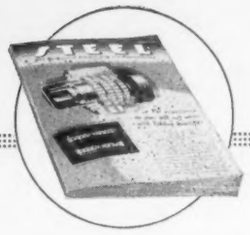




March 31, 1947

Strangling the Goose

Annual report of United States Steel Corp. for 1946 poses an important question to the American people and to their representatives in Congress. The question is whether or not present policies of the federal government are restricting profits of business too drastically.

Strange as it may seem, U. S. Steel made a lower net profit in the last five years than in the first five years of its 45-year history. In the five-year period of 1942-46, the corporation earned a profit of $341,200,000 on $9,160,900,000 of sales. In the five years of 1902-06 inclusive, it earned a net of $342,600,000 on sales of only $2,039,400,000. In short, in the five-year period of highest sales volume during its entire history, U. S. Steel made a smaller profit than in the five-year period when sales were the lowest on record.

This startling comparison reflects the influence of nearly half a century of changing government policy which has progressively narrowed the profit margin of American business. A clear idea of what has been happening can be gained from the following table, which shows the sales dollars of the first five and last five years of U. S. Steel's operations broken down in cents for each item:

	1902-06	1942-46
Employment costs	30.3	45.6
Yearly taxes accrued	.8	6.2
Products and services bought	38.6	37.7
Wear and exhaustion	6.8	6.5
Interest and other costs on debt	6.7	.3
Profit, for dividends and reinvestment in business	16.8	3.7
	100.0	100.0

Note carefully that the shares of the sales dollar going to employees and to the government have increased sharply, that the portions for products and services bought and for wear and exhaustion have changed only slightly, and that the cost of hiring money and the net profit remaining for stockholders and for reinvestment in the company have shrunk alarmingly.

Few fair-minded persons believe it would be wise, even if it were possible, to restore the pattern of 1902-06, wherein profit takes 16.8 cents of the sales dollar. However, 3.7 cents on the dollar over a five-year period obviously is inadequate for the proper maintenance of a healthy business enterprise.

If the people could understand what is going on, they would ask Congress to loosen the restraints before the Golden Goose is strangled.

* * *

MORE POWER IN SIGHT: Electric light and power companies have earned an enviable record of "never too little, never too late." Throughout the war period and since, these utilities somehow have managed to keep ahead of the demand for their product.

Much of their success in this respect is due to the scientific manner in which they study the future needs of the communities they serve and plan accordingly. This procedure has worked so well in the past that one can be confident that any preparations now being made by the power companies reflect quite accurately the calculated growth in consumption of electricity in the years ahead.

It is estimated that $1.75 billion of electrical generating equipment with a capacity of 13 million kilowatts now is on order. Allowing for the expectation that 20 per cent of this new equipment will replace old facilities, the net effect of the installation of equipment now on order will be an increase in national capacity from 63 million to 73 million kilowatts. About 78 per cent of the new 13 million

(OVER)

AS THE EDITOR VIEWS THE NEWS

kilowatt capacity is for business-managed public utilities, as distinguished from government-owned and private industrial power plants.

This preparation for the future should interest many manufacturers. The equipment and appliances they will manufacture in the near future will require much of the electricity to be generated by the new facilities now being built. —p. 61

° ° °

SIX STRAWS IN WIND: Six recent events indicate how the pressure of public opinion is working effectively to correct abuses of power by union labor.

During the past few weeks these things have happened: Rubber workers agreed to an increase in wages of 11½ cents per hour after having demanded an increase of 26 cents. After striking for 329 days, employees of Allis-Chalmers Mfg. Co. went back to work without winning concessions or a new contract. John L. Lewis withdrew his notice abrogating the mine workers' contract, as directed by the Supreme Court. After striking for 440 days, employees of J. I. Case Co. returned to work on the terms offered by the company last year. Government and labor unions have begun in earnest to purge their ranks of communists and communist sympathizers. House and Senate have voted decisively to outlaw portal-to-portal pay suits.

The pendulum of labor relations is swinging back toward the center of sanity. —pp. 54, 60

° ° °

MORE STEEL CAPACITY: Two of 14 open-hearth furnaces at the Cleveland district plant of Republic Steel Corp. have been employing oxygen applied directly to the bath for more than three months in the regular production of steel. The result has been a reduction in the time required to produce a heat of steel from 12 hours to between 6 and 7 hours. This has increased production by more than 50 per cent and there is reason to believe that under ideal conditions and in furnaces specifically designed for this type of operation an even greater increase in production can be obtained.

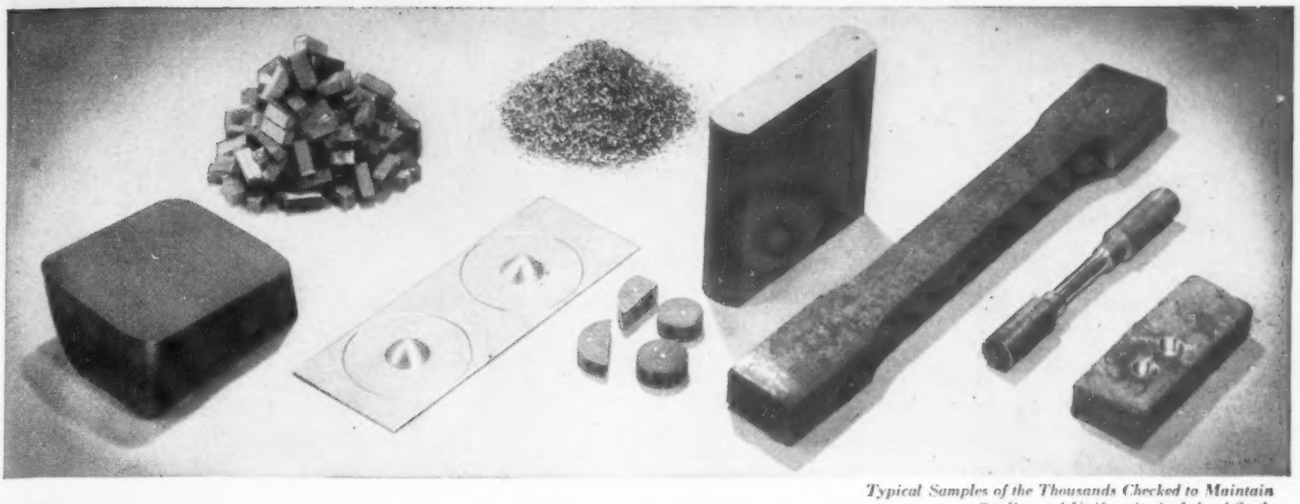
With this development carried to a successful conclusion, its application to all 14 furnaces in the Cleveland plant would, in effect, be the equivalent of adding a new steelmaking department of seven 200-ton open hearths.

This is a possibility of tremendous significance. It may signify one of the greatest developments in decades of steelmaking. —p. 88

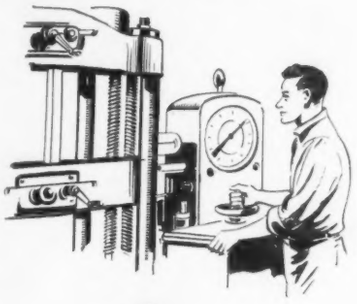
SIGNS OF THE TIMES: A house committee which has been handling legislation pertaining to the National Science Foundation is expected to ask the House Ways and Means Committee to consider the suggestion made by Dr. Frank Jewett, president of the National Academy of Sciences, that the present 15 per cent limit for deductions on gifts to charitable and educational institutions (p. 58) be increased to 20 per cent. Dr. Jewett believes the change would provide substantially increased funds for research work. . . . Announcement by Pittsburgh Consolidation Coal Co. that it plans a research and development program to perfect commercial processes for making gasoline and a gas fuel of high heat value from bituminous coal (p. 68) may prove to be an important initial step leading to revolutionary changes in the coal industry. . . . After chalking up a new postwar record by turning out 107,230 units in the week ended Mar. 22, automobile manufacturers last week felt the impact of a blizzard (p. 65) which held automobile output well below the 100,000 mark for the first time in five weeks. . . . Designers and engineers have a new engineering material possessing many desirable properties. It is aluminum coated steel (p. 80) in which the surface characteristics of aluminum are combined with the mechanical and physical properties of steel. . . . After five weeks of advances, the wholesale commodity price index of the Bureau of Labor Statistics (p. 70) declined 0.3 per cent in the week ended Mar. 15. This is too faint a break to be taken seriously, but a general reversal in price trends cannot be far away. . . . The traditional function of welding is to join metal to metal. However, an Illinois manufacturer reverses the process and employs resistance welding (p. 82) to pull apart rail steel bars to form perfectly pointed harrow teeth. This process effects savings exceeding 50 per cent. . . . Editor Irwin Such was impressed by the realism with which the successful Western Metal Congress and Exposition which closed in Oakland last Thursday (p. 86) reflected the enhanced postwar importance of the metalworking industries of the Pacific Coast. More than 40,000 attended the show and almost a third of the exhibits were those of West Coast companies. . . . By redesigning crates and changing the arrangement of tiers of crates in freight cars (p. 104), a Cleveland manufacturer loads an average of over 25 per cent more washing machines in each car. This is economy that counts.

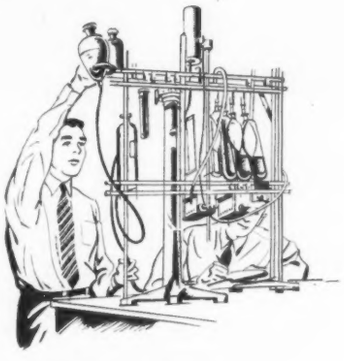
E. L. Shaner

EDITOR-IN-CHIEF



Typical Samples of the Thousands Checked to Maintain Quality and Uniformity in Inland Steels





Hundreds of Tons of Samples are Tested Yearly

Making steel, the basic material of our modern world, is no simple process — nor is it one of small responsibility. For in making steel thousands of requirements must be satisfied, many involving consideration for human life as well as the reputation of designers, fabricators and builders of equipment. Operations of such consequence call for constant checks and rigid testing — ruling out all guesswork.

In the course of a single year hundreds of tons of steel samples undergo chemical, tensile, metallographic, etch and other tests at Inland. Chemical analyses alone run well over a thousand tons. These precautions are taken to furnish a uniformity and quality in steel that will fully measure up to every requirement.

For the benefit of steel users, Inland maintains a large specialized staff of engineers and metallurgists who will gladly cooperate with you in the selection and use of steels — without obligation.

Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. Principal Products: Bars • Structurals • Plates • Sheets • Strip • Tin • Plate • Floor Plate • Piling • Reinforcing Bars • Rails • Track Accessories.

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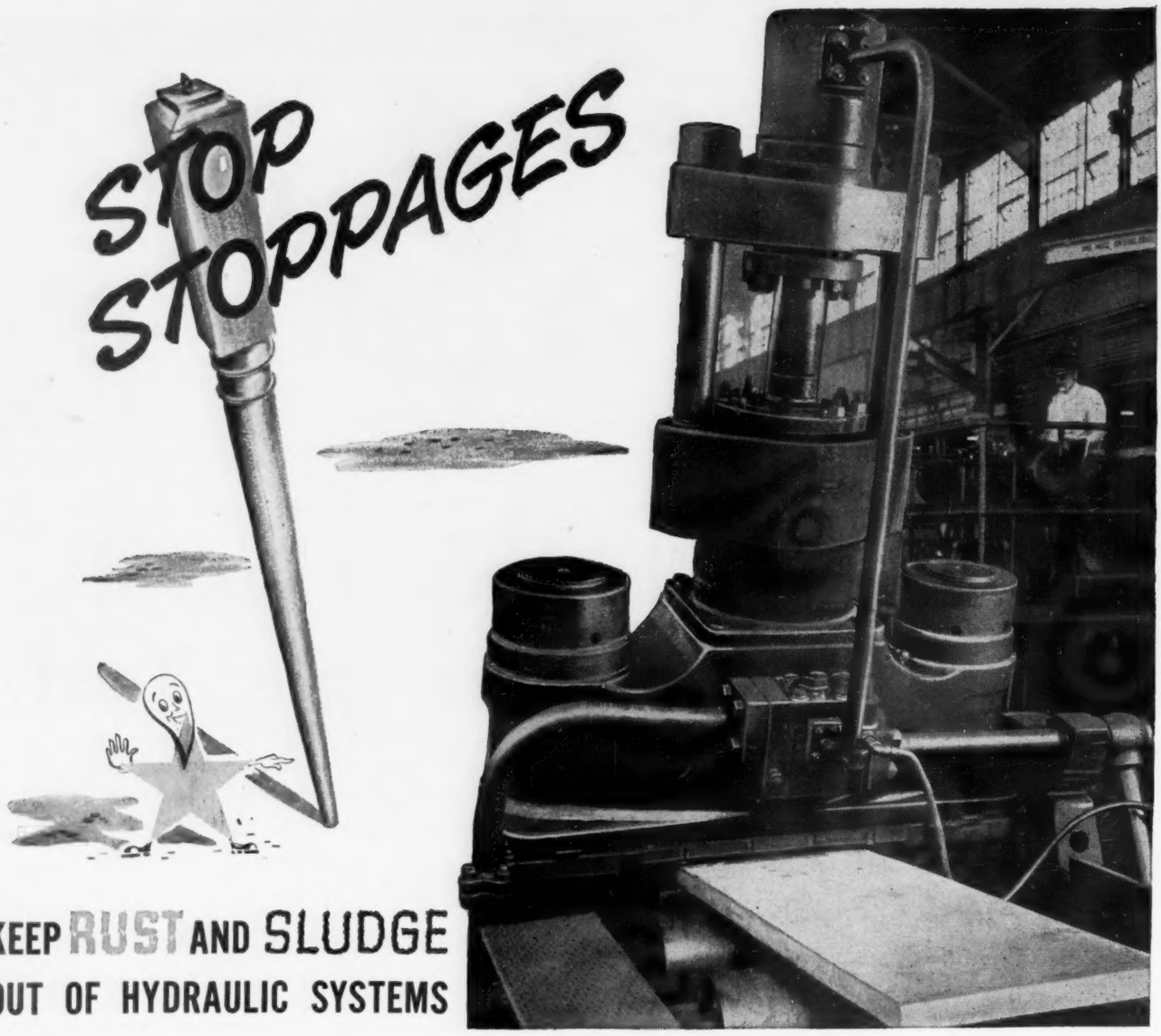

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For example, one manufacturer states that, since using *Texaco Regal Oils (R & O),* drain period intervals have been tripled and varnish deposits previously encountered have been entirely eliminated.

Leading makers of hydraulic equipment either ship their units filled with *Regal Oils (R & O)* or recommend their use. There is a complete viscosity range to assure trouble-free, economical performance from hydraulic machines of all types.

For full information, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

1 OIL — 3 JOBS

Lubricate automatic chuck-type screw machines with *Texaco Cleartex Cutting Oil DD* — it serves as machine lubricant, hydraulic fluid and cutting oil. This special multi-purpose oil is a typical example of Texaco research and machining know-how at work to help you cut metal better and faster at lower cost.

TEXACO

TEXACO Regal Oils (R&O)

FOR ALL HYDRAULIC UNITS

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

Demand for steel and more steel is causing steel mill operations to be pushed as high as facilities and materials will permit. Above, a night scene at Bethlehem Steel Co.'s Bethlehem, Pa., plant

Steel Buyers To Fight Gray Market

Two hundred steel-consuming companies in Pittsburgh district protest fanciful prices asked by irregular sources. Ask co-operation of larger producers in curbing "bootleg" offerings. Producers doubt tonnages offered actually available

AN ATTEMPT to organize resistance to the steel "gray" market is being made by a group of 200 small metal goods manufacturers in the Pittsburgh area. These manufacturers have pledged not to buy steel through irregular channels at above-market prices and have enlisted the help of the larger producers to check the source of the steel thus offered.

The 200 manufacturers are organized as the Smaller Manufacturers Council. Most of them depend on steel as a raw material. None has more than 500 employees.

Rebelling against offers from "brokers" to supply them with urgently needed steel at prices "four, five and even six times the mill price," the small companies have directed letters to the presidents of United States Steel Corp., Bethlehem Steel Co., Weirton Steel Co., National Steel Corp., Youngstown Sheet & Tube Co. and Jones & Laughlin Steel Corp. appealing for help. The companies have indicated their willingness to meet with the council's members to discuss the matter whenever the smaller companies have concrete evidence to offer.

The problem is so vital to the smaller manufacturers, the council's letter said, "they have come to the point where they feel they are not being dealt with fairly. In fact they are getting angry to the point where they are no longer reasonable and talk runs to investigations and legislation.

"Obviously, nothing is to be gained by fighting between suppliers and users and it is our feeling that if there is any investigating to be done, it should be done by you for your own protection.

"Would you be willing, if we submit actual cases of quantity and prices, to find out the facts and sit down with us in amicable discussion about the whole matter?" the council's letter asked.

Steel producers generally are convinced that reports of the tonnages of steel being offered through irregular channels are exaggerated, and that there has been more publicity than tonnage involved in the whole matter. That some tonnage is being moved and that large tonnages are being offered, however, is not denied.

Jones & Laughlin Steel Corp. recently attacked the problem in newspaper advertisements. J. & L.'s statement pointed out that many steel buyers have become convinced that there is a large and active black market. The company declared it has not participated in the black market and will continue to distribute its steel products "through normal, legitimate channels in a sincere effort to apply all available steel to the best interests of our customers."

The company said that the would-be black market operators have become so bold that the integrity of steel company managements generally has been impugned. Its own investigations, the company said, reveal that the "large and

continuing tonnages offered are not available." The small transactions that have been uncovered "while regrettable, do not have an important effect upon the normal distribution of steel."

Although the action of the small consumers at Pittsburgh was the only reported instance of organized resistance by steel buyers to offers of material at fancy prices, an increasing number of companies in other areas have gone on record individually as refusing to deal with irregular sources. Along the eastern seaboard such consumers as the railroads and utility companies have refused to buy in the gray market on such a broad basis as to give their action the appearance of an organized resistance. Where buying through irregular channels is reported, there is evidence of increasing resistance to the fanciful prices asked.

In Detroit, practically all the larger tonnage buyers in the automotive industry have been approached time and again with offers from individuals they have never heard of, but uniformly they have met firm refusals. Even if the reported tonnages exist—and there are strong doubts in the minds of most buyers on this score—they would not interest the motor industry at prices two and three times the mill price, simply because careful cost control would not permit it. One large manufacturer has been receiving steel on an arrangement with two mills to melt scrap for ingots and then roll them to sheet and strip, but no great premium is involved in this.

FTC Making Investigation

The Federal Trade Commission is known to be investigating the gray market and is seeking names and addresses of brokers who are offering tonnage at premium prices. However, most observers believe that by the time a full-blown investigation could be launched by the FTC the fancy market will have evaporated.

Steel producers who have attempted to run down reports of offers of fabulous tonnages usually have had little success. Generally they believe brokers making such offers do not have physical possession of the material but are "selling short," hoping they can pry the tonnage out of a mill before it has to be delivered.

Fanciful plans to capitalize on the current situation pop up daily. One of the latest is an offer to a leading iron and steel scrap company by an outfit purporting to deal in "sugar products," as follows:

"Here's the way to convert your steel scrap on letter of credit basis and at a silly price.

"Listen—here's how it is—

"We are institutional wholesalers, specializing in scarcity items, particularly industrial sweetening.

GERMAN GRINDER: Warrant Officer James Odell operates a German grinding machine at the Frankford Arsenal, Frankford, Pa. Work is projected on a screen to aid accuracy. Acme photo

"And so it goes from one scarcity item to another—and here is the widest jump of all—from the food business to COLD ROLLED SHEET, but it is still raw materials business.

"Our customers, from time to time, ask us to locate scarcity items for them, and lately we have been getting a tremendous number of inquiries for up to 50,000 ton of COLD ROLLED SHEET, together with offers to pay silly prices.

"Now you are a considerable factor in the steel scrap business and, doubtless, are in a position to trade scrap for COLD ROLLED or even to have it rolled for you.

"This is the way, we think, to sell your steel scrap on letter of credit basis at silly prices, and may or may not be an angle which will enable you to tap hitherto unused sources of profit.

"What do you say?"

"P.S. We also have numerous inquiries for ANNEALED and GALVANIZED two-strand BARBED WIRE. Can you do anything on that?"

Use of Scrap, Pig Iron in January Hits Postwar High

Highest total melt of iron and steel scrap and pig iron since May, 1945, was reached in January of this year, according to the Bureau of Mines, U. S. Department of the Interior. The melt was estimated at 8,872,000 gross tons, a gain of 22 per cent over the total consumption in December, 1946, of 7,256,000 gross tons, the bureau reported. Of the total, 1,949,000 gross tons was purchased scrap; 2,426,000 tons, home scrap; and 4,497,000 tons, pig iron.

Consumption of purchased scrap increased 7 per cent over December; home scrap consumption was up 24 per cent and use of pig iron in the melt gained 30 per cent over the previous month.

Steel furnaces were forced to use proportionately more pig iron in January than in December due to the shortage of scrap. Pig iron constituted 54 per cent of the steel-furnace melt compared with 51 per cent in December. Gray iron foundries used scrap and pig iron in greater quantities than in any month since October, 1941.

Stocks of iron and steel scrap at consumers' plants at the end of January were estimated at 2,577,000 gross tons, compared with 2,709,000 tons on Dec. 31, 1946, a decrease of 5 per cent. Purchased scrap stocks were at a 26-day supply based on January's consumption rate of 1,949,000 tons. Scrap iron dealers reported having 247,560 tons of material on hand on Jan. 31.

American Brake Shoe Plant To Be Completed by July 1

American Brake Shoe Co.'s new $200,000 plant at Niles, O., should be completed and ready for operation about July 1, company officials say. Located on the site of the old Thomas sheet steel plant which was dismantled about 15 years ago, the facility will make locomotive castings.

Attendance at Tool Engineers' Meeting Heavy

Nearly 3000 attend Houston, Tex., sessions. Engineering problems in specific tool uses discussed

HOUSTON, TEX.

BREAKING away from the tradition of holding its national meetings in the Northeast and Middlewest, the American Society of Tool Engineers picked Houston as the place for its 15th annual meeting, Wednesday to Saturday, Mar. 19-22.

Nearly 3000 visitors crowded the convention rooms in the Rice Hotel, and the sessions received widespread attention in the press and on the radio.

Interest was centered on tool engineering problems encountered in the manufacture and use of tools, instruments and equipment used in oil well drilling, petroleum refining and magnesium industries—including thread grinding and high speed production machining.

Industrialists Speak

Among nationally known industrialists who spoke at the sessions were: Frank J. Tone Jr., vice president and general manager, the Carborundum Co., Niagara Falls, N. Y.; Ernest V. Flanders, chief engineer, Thread Grinding Division, Jones & Lamson Machine Co., Springfield, Vt.; James F. Lincoln, president, Lincoln Electric Co., Cleveland; A. A. Nichoson, assistant to vice president, the Texas Co., New York; N. D. Griswold, assistant general manager, Dow Chemical Co., Freeport, Tex.; Dr. W. A. Woolrich, dean of engineering, University of Texas, Austin; Dr. R. R. Morse, director of exploration, Shell Oil Co. Inc., Houston; Philip M. McKenna, president, Kennametal Inc., Latrobe, Pa.; and Col. W. F. Rockwell, president, Rockwell Mfg. Co., Pittsburgh.

National officers of ASTE for 1947-48, who were introduced and who took office at the close of the meeting in Houston, are as follows: President, William B. Peirce, vice president, Flannery Bolt Co., Bridgeville, Pa.; 1st vice president, Irwin F. Holland, general superintendent, Small Tool & Gage Division, Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford, Conn.; 2nd vice president, Robert B. Douglas, consulting engineer, Montreal, Quebec, Canada; 3rd vice president, George C. Johnson, chief engineer, W. F. & John Barnes Co., Rockford, Ill.; secretary, William A. Dawson, branch manager, F. F. Barber Machinery Co., Hamilton, Ont., Canada; treasurer, Victor H. Ericson, vice president, Johnson de Vore Inc., Boston, Mass. Harry E. Conrad, Detroit, continues as executive secretary of the society.

New Tool Ordering Drops 12 Per Cent in February

Continuing the decline which began last April, orders for new machine tools in February reached a new low for the postwar period. Twelve per cent below January sales, which had previously marked the low point in postwar ordering, February's dollar volume of orders was slightly below the 1939 monthly average, according to the National Machine Tool Builders' Association, Cleveland. In view of present increased cost of machinery over 1939, ordering is down substantially from that year.

New ordering is still deterred by War Assets Administration offerings of surplus tools far below the price of new machinery, and although stocks of surplus standard and multi-purpose tools have largely been picked over by prospective buyers, WAA's inventory is still huge.

A decline in foreign ordering was also noted, the proportion of export business falling to about 24 per cent from a January figure of about 29 per cent.

Also contributing to the order decline of the tool industry is uncertainty over expansion and modernization programs by potential machine tool buyers. High construction costs and inability to obtain materials are causing postponement or abandonment of plans which would have involved considerable new machinery purchases. Indicative of the trend toward retrenchment by buyers is the increase in order cancellations, which in February rose about 17 per cent over January.

Shipments of machine tools rose slightly during February, amounting to $26,594,000. This compares with January shipments of $26,542,000.

Present, Past and Pending

■ MONSANTO PROJECTS $50 MILLION PROGRAM

ST. LOUIS—Monsanto Chemical Co. has a $50 million construction program in the engineering and planning stages, in addition to a $22 million building program underway. Major portion of the new construction will be devoted to new products.

■ FABRICATED STRUCTURAL STEEL BOOKINGS UP

NEW YORK—Fabricated structural steel bookings for February amounted to 124,436 tons, 22,000 tons more than in January. The January-February total of 226,305 tons is 11 per cent above the average for the five prewar years, 1936-40.

■ PRICE OF SURPLUS TOOLS TO SCHOOLS REDUCED

WASHINGTON—More than 300 types of surplus metalworking machinery will be offered to schools at a reduced price of 5 per cent of "fair value" under a revision of Order 7 to Regulation 14, War Assets Administration.

■ STORM CAUSES BLAST FURNACE SHELL TO CRACK

LORAIN, O.—Shell of a National Tube Co. blast furnace was cracked as result of last week's blizzard and required the stack to be banked for several days. Damage was attributed to fast cooling of the shell, which set up a a temperature gradient and caused severe stresses and rupture. Repairs were made by welding and strapping the platework.

■ PACIFIC ISLAND SURPLUS SOLD TO CHINA

WASHINGTON—Virtually all movable surplus property on some 15 or 16 Pacific islands has been sold to the Chinese government, canceling any prospect that the material will be returned to this country as scrap, hearings before the House Surplus Property Committee have revealed.

■ GEAR SALES INCREASE 7.4 PER CENT

PITTSBURGH—Sales by the gearing industry, as represented by the American Gear Manufacturers Association, show a gain of 7.4 per cent in February over January. Figures do not include turbine or propulsion gearing.

■ HEARING ON CONSOLIDATED PURCHASE APR. 7

WILMINGTON, DEL.—U. S. District Judge Richard S. Rodney has denied a plea by Columbia Steel Co. against holding a hearing on the government's injunction suit to prevent the company from purchasing Consolidated Steel Corp., Los Angeles. Hearing will be held Apr. 7.

Dearth of Hot Sheets Intensified

Combination of production and distribution factors accentuates shortage. Producers deny curtailing output

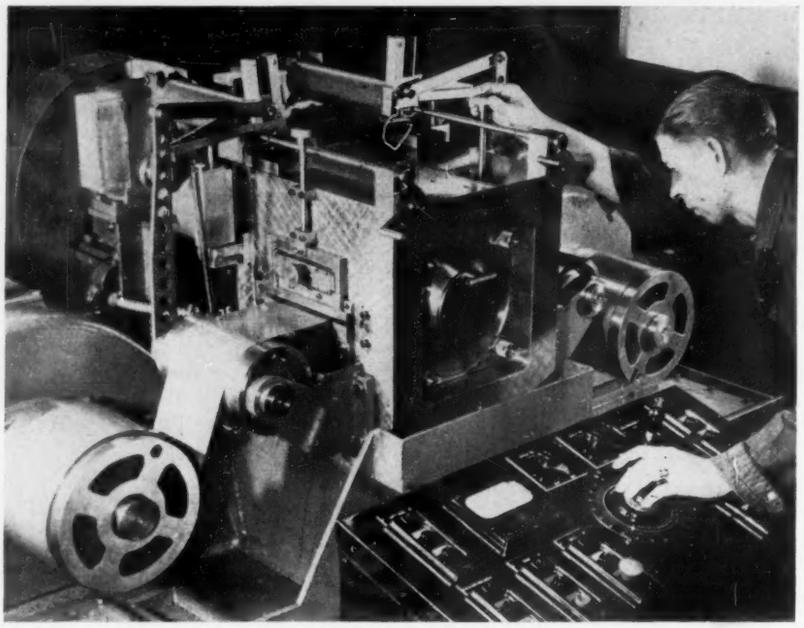
ANSWERING a crescendo of charges that hot-rolled sheets and strip are being diverted in increasing proportion to the cold-rolling mills to the disadvantage of metal stampers and other consumers, steel producers last week emphatically denied they aim to cut off or curtail supplies of hot-rolled, pickled and oiled sheets and strip to general industry.

Stamping manufacturers report they have been meeting with increasing difficulty in obtaining hot-rolled supplies, at the same time noting growing reluctance on the part of the mills to supply tonnage in former proportionate volume.

One stamper, for example, states that for the past 15 years he has purchased the greater portion of his tonnage from four mills. However, he now is told by one mill that it has definitely gone out of the production of hot-rolled while a second mill states it is going out of the production of this commodity about June 30, intending to concentrate on cold-rolled items and tin plate. Still another producer is spending $19 million for additional cold-rolled equipment which will take up the major portion of its hot-rolled output, and a fourth mill, spending $21 million for additional cold-rolled equipment, refuses to take any of this stamper's business on the heavier hot-rolled sheets.

Stampers Fear Curtailed Production

Since 14-gage and heavier sheets have been heretofore obtainable principally in the hot-rolled category, many stampers fear these heavy gages may be further curtailed in production. Such a situation would be particularly distressing in view of the expanding sheet and strip demand for stamped plumbingware, stamped heating equipment, domestic appliances, etc. Curtailment of hot-rolled supplies to manufacturers by subjecting sheet and strip in all gages lighter than 14 to the additional cold-rolled processing, which takes additional time and requires additional facilities, will only further hamper needed production of finished goods, the stampers claim, at the same time declaring that the move seems to be an effort on the part of the steel producers to force all manufacturing industry to use the higher-priced cold-reduced product.



"VESTPOCKET" ROLLING MILL: This miniature rolling mill is used by Westinghouse Research Laboratories, Pittsburgh, to reduce strips of Hiperco, a new highly magnetic alloy developed by Westinghouse, to a thinness of 1/2000 of an inch. The tiny precision mill enables scientists to delve deeper into the forces at work in magnetic materials. Photo shows operator adjusting tension preparatory to reducing strip to less than tissue-paper thinness. Acme photo

Complaints of consumers are coming from all sections of the country. In the East buyers report continued difficulty in obtaining shipments of hot-rolled, charging that much of their trouble is due to the diversion of production to the cold-reducing mills. However, most users in the area are accepting cold-reduced sheets without too much complaint, paying the premiums that apply on most gages, for they are anxious to obtain steel. Further, many state they realize that the trend will probably continue toward cold-rolled production as time passes.

Some leading steel sellers have not been actively soliciting hot-rolled sheets in the East for some time past, some even since before the beginning of the war. They would accept tonnage from customers, but usually on the basis of being given a certain tonnage of cold-rolled sheet business at the same time.

Some minor complaints have been heard in the Detroit district from manufacturers seeking to buy hot-rolled sheets and strip and being unable to get delivery. However, in cases, a switch has been made to cold-rolled despite its higher cost. The automobile industry, of course, is the largest user of sheet and strip in the world, and hence brings the greatest pressure for hot-rolled and cold-rolled material on suppliers.

It is believed most complaints about shortage of hot-rolled come from pressed steel plants which formerly bought smaller quantities of certain special gages from hand mills which are no longer in operation. Now they are unable to get a place on books of other steel suppliers who anyway might not be able readily to make a special mill set-up to roll the gages required.

The steel industry currently is expanding capacity for hot-rolled to the extent of 1,000,000 tons annually, and for cold-rolled 2,500,000 tons, Detroit interests point out.

The automobile industry currently is taking an estimated 40 per cent of all hot-rolled and cold-rolled material, and still complains about short supplies. Breakdown of the flat-rolled steel requirements for the average passenger car shows a gross of 1652 pounds of hot-rolled and 964 pounds of cold-rolled.

STEEL's Chicago district editor reports producers of sheets and strip agree readily that consumers are not getting sufficient tonnage of hot-rolled material to support manufacturing operations, but they deny strongly they are contributing

to this situation by channeling an increased proportion of their available steel into cold-rolled production.

As far as 1946 is concerned, the denial of steelmakers has statistical support. Whether a trend toward a larger proportion of cold-rolled has developed in the past three months can not be proved until production figures are announced.

In its monthly statistics on production and shipments of finished steel, the American Iron & Steel Institute gives detailed figures on hot and cold-rolled sheets and strip. In 1946, cold-rolled sheet production amounted to 39.8 per cent of hot-rolled output, and cold-rolled strip was 53.6 per cent of hot-rolled. Monthly percentages varied markedly because of the impact of the steel strike and two coal strikes, but the percentages over latter months of the year give no hint that a trend is developing in favor of cold-rolled production.

This point is illustrated by the following figures:

RATIO OF HOT-ROLLED PRODUCTION TO COLD-ROLLED PRODUCTION, PER CENT

1946	SHEETS	STRIP
January February	45.8*	59.9*
March	36.0	47.3
April	36.4	65.1
May	40.5	66.2
June	40.0	56.4
July	39.4	44.6
August	39.8	51.2
September	38.8	51.0
October	39.0	51.3
November	40.1	53.1
December	40.0	50.0
Average	39.8	53.6

* Because of the coal strike, American Iron & Steel Institute consolidated the January and February reports.

Only release by the Institute of statistics for the first three months of 1947 will prove whether the former balance is being preserved.

Since V-J day demand for cold-rolled sheets and strip has been tremendous and mills have operated these facilities as close to maximum as possible. Mills admit the better profit in cold-rolled material, but disclaim setting up schedules on that basis. They admit also that new facilities under construction are mostly for cold-rolled—for which present capacity is inadequate—but they also state that hot-rolled facilities are being modernized and speeded up at the same time so that this output will not suffer.

In the New England district, STEEL'S district editor reports that a mounting combination of production and distribution factors promises to intensify shortages in hot-rolled carbon sheets, and also hot strip to considerable degrees. These are: Withdrawal from the territory of hot-rolled tonnage offerings by some mills; heavier requirements for incoming cold-rolling capacity; increased schedules for tin plate, and a general tendency on the part of most producers to carry finishing operations, including cold-reduction, to higher levels for better profit margins.

Although the pinch for hot-rolled is experienced by most sheet users, New England stampers, with peak postwar backlogs, are confronted with growing shortages. Substantial demand for hot-rolled in New England is on heavier gages for stampings, automobile requirements and 375-gallon household tanks, among others, taking gages from 5 to 12. These gages in cold-rolled stock are difficult to obtain. Bulk of cold-rolled comes in No. 14 gage and lighter with the supply of hot-rolled reduced and the extent that relief may come from heavier output of cold-rolled limited by gage for many users.

New cold-rolling capacity scheduled to come into operation this year is estimated at over 2 million tons with 1,375,000 tons in 1948. To engage this capacity less "free" tonnage from the hot mills will be available, the capacity increase in hot mills being far below that scheduled for cold reduction.

Many stamping shops use hot-rolled up to 75 per cent or more of stock fabricated, substantial tonnage in heavier gages than Nos. 14 or 13, the limit for bulk of cold-rolled production. Also, steel requirements of stamping shops are far in excess of prewar levels although the use of aluminum alloys is growing in the production of many stamped parts. Design and improved die and press practice are enabling stampers to enter fields for parts and products heretofore recognized as established for other forms of metal shaping.

Pittsburgh district producers explain the current stringency by pointing out that output of all flat-rolled steel products is lagging far behind the huge demand accumulated during the war years. At the same time they acknowledge it is no secret that tin plate and cold-rolled sheets are more profitable items than hot-rolled sheets, and that as long as there is such a heavy demand for the former it is only natural facilities for producing such items will be operated at capacity. Full-scale tin plate output limits production of cold-rolled sheets, while exceptionally heavy demand for cold-rolled sheets restricts distribution of hot-rolled. Another factor is that distribution of sheets as well as other steel products has been revised to some extent by the mills in recent months in an effort to avoid unnecessary and costly freight absorption.

None of the Pittsburgh mills, however plans to discontinue production and sale of hot-rolled sheets and strip, though it is admitted that as projected new cold-reduction mills come into operation the hot mills will be under increasing pressure from them for supplies.

Machine Tool Distributors Discuss Trade Outlook, Mechanization at Spring Meeting

SPRING meeting of the American Machine Tool Distributors' Association, Edgewater Beach Hotel, Chicago, Mar. 24 and 25, was devoted largely to the general outlook for the machine tool industry and the effect of the world industry mechanization.

Opening with a general session, under chairmanship of George Habicht Jr., president of the association, nearly 200 members and guests were addressed by Herbert H. Pease, president, National Machine Tool Builders' Association. Mr. Pease, who also is president, New Britain Machine Co., New Britain, Conn., dealt with some of the things being done by the industry as a whole to overcome the adverse effects of various conditions—including "bargain sales" of surplus machine tools by government agencies.

Under the title, "One World: Mechanized" Burnam Finney, editor, *American Machinist,* addressed the dinner meeting on the march of the "mechanical way of production" into places hitherto in the handicraft era. He dealt with the good social and industrial effects of this trend if it proceeds under proper conditions.

Other problems considered during the meeting were those involved in the surplus property situation, and those involving sales and service demands on builder and dealer organizations. Guest speaker at the final session was Tell Berna, general manager, National Machine Tool Builders' Association, who revealed plans which the association has for stimulating worldwide interest in the latest American machine tools.

WAA Recovers $9.5 Million On Tool Sales in Cleveland

Sale in a year's time of over $30,865,000 (acquisition cost) of surplus machine tools and related equipment by "approved" dealers in the Cleveland region was reported last week by War Assets Administration. The sales brought the government $9,447,000, a recovery of 31 per cent.

Labor Picture Beginning To Clear; Wage Hikes Expected To Be Modest

Rubber workers' acceptance of 11½ cents may indicate pattern for major industries. Unions lose in security contests in long disputes. Portal pay suit bills approved by both houses in Congress. Anti-communist drive to weaken radical leadership

RECENT developments on the labor front and in Washington encourage confidence that outstanding labor disputes may be resolved peacefully and that recurrence of the strikes and work stoppages that so disrupted 1946 industrial production may be prevented.

Labor leaders generally have taken cognizance of the change in public and governmental attitude toward their demands and generally have adopted a more reasonable attitude than they have had for years. Present indications are the major unions will gladly settle for a modest wage increase.

Within the past several weeks at least six developments have occurred presaging general industrial peace. These include:

1. Acceptance by the United Rubber Workers of a wage agreement calling for an increase of about 11½ cents an hour. Originally the rubber workers had demanded a 26-cent advance.

In many quarters it is believed the 11½-cent figure in the rubber workers' contract indicates a pattern for settlement of wage negotiations still pending, including those in steel and automobiles.

2. Settlement of the 329-day Allis-Chalmers Mfg. Co. strike, with no concessions and no contract won by the strikers.

3. Bowing of John L. Lewis to the government and the withdrawal of his contract abrogation notice as directed by the Supreme Court. This obviates the threat of a coal strike as long as the government retains control of the mines.

4. Settlement of the J. I. Case Co. 440-day strike on the same terms offered by the company last year.

5. Acceleration of the drive to decommunize the leadership of labor unions and the probable loss of influence of communist labor leaders that will follow the government's anti-red campaign. Political philosophy of influential "friends of labor" in the government already is under investigation. This will cause a loss of prestige, if not the removal, of communist sympathizers in government posts.

6. Passage of bills to outlaw portal pay suits by both the House and Senate and the sending of the measure to conference to adjust differences. Uncertainties incident to portal pay suits asking billions of dollars from hundreds of industrial companies have been a major obstacle to negotiation of new wage agreements. Although the portal bill faces the possibility of a Presidential veto, the decisive nature of the Senate vote, 64 to 24, suggests the upper house can muster enough votes to override a veto. The House passed its bill by an even greater majority.

Negotiations between steel producers and the United Steelworkers of America have made little progress since they began the middle of February, due in large part to uncertainties over the portal pay liabilities. For the past six weeks, the negotiators have met at intervals to discuss noneconomic issues, but have avoided the wage issue. The union up to the end of last week had not set a definite wage demand, beyond their original request for a "substantial" increase. The contract extension, agreed upon by the union and the companies last Feb. 15, expires Apr. 30.

Meanwhile steel payrolls, employment and production have continued at high levels, in sharp contrast to the early months of 1946. For January, steel payrolls established a new record, exceeding even the wartime peak, at $155,778,000. This compares with $154,976,700 paid in March, 1945, the previous record, and with $137,216,500 in December, when steel production was adversely affected by the coal strike.

Average hourly earning of steelworkers in January also set a record at $1.374, compared with a full-year hourly average of $1.347 during 1946. Wage earners worked an average of 40.4 hours during January, compared with 35.7 hours in December, 1946. Total employment in the industry during January was at the highest level since 1943. Average number of employees during the month totaled 601,200, of which 512,600 were wage earners and 88,600 were salaried employees.

NOT FOR THEM

Supervisory employees of the Allegheny Ludlum Steel Corp.'s Watervliet, N. Y., plant recently presented a resolution to H. G. Batcheller, president of the company, opposing their own unionization. The resolution was signed by the entire supervisory force.

The resolution read: "In view of the recent Supreme Court decision in the Packard case, we the managers, department managers, assistant managers, superintendents and foremen, constituting the management of the Watervliet plant, confirm our belief that the unionization of management is not consistent with the best interests of the corporation."

MODERN PERSONNEL CARRIERS: Miners ride to the "working face" in Pittsburgh Consolidation Coal Co. mine in new safety man-trip cars. Company spent $5,533,000 last year and has earmarked $15 million more for the next three years for installation of modern equipment to increase coal output and provide greater safety and comfort for workers

U. S. Steel Finds Earnings Subnormal Despite High Level of Operations

Low return precludes adequate provisions for reinvestment. Profit during war years was only 4 cents per dollar of sales; in 1946, only 6 cents per dollar of sales. Increases in costs have outstripped advances in steel prices

ALTHOUGH United States Steel Corp. operations in 1946, when not interrupted by the steel and coal strikes, were at a level not exceeded in peacetime during the corporation's 46-year history, its earnings were the lowest per dollar of sales of any peacetime year of comparable volume of shipments.

These subnormal earnings at high levels of operations were largely the result of wartime dislocations of wages and prices that persisted into 1946, and which are expected to continue to be felt for some time.

The corporation, in its pamphlet report, finds there are specific reasons why its 1946 earnings were too low under existing conditions, and why in the future it should earn at better rates.

The corporation points out that it cannot expect operations to continue indefinitely at present peak levels. In the past, U. S. Steel has used from as little as two-tenths of its capacity to as much as nine-tenths. Owing to substantial fixed costs, its income is subject to even more violent fluctuation than its volume. Profits in years of large volume must compensate for lesser profit or loss in years of reduced volume.

Comparison Indicates Dislocations

Comparison of 1946 results with those of earlier years indicates the dislocations. On shipments of 15.2 million tons of steel products, the corporation earned $88.6 million, or 6 cents per dollar of sales. On five selected earlier good years (1920, 1923, 1926, 1928, 1940) when shipments averaged 15.5 million tons, profit averaged 10 cents per dollar of sales. For the 22 peace years between the two wars (1919-1940), shipments averaged 12 million tons and profits 5 cents per dollar of sales.

On the other hand, five poor years (1921, 1931, 1932, 1933, 1934) resulted in average shipments of only 6.9 million tons and a loss of 6 cents per dollar of sales. During the five war years (1941-1945) shipments averaged 20.1 million tons, but profits, due to excess profits taxes, increased costs and price ceilings, averaged only 4 cents per dollar of sales. These factors prevented the company from setting aside those amounts for reinvestment which its experience indicates are desirable as well as wise.

If the record of the past is any measure of the future, U. S. Steel has entered a period of peace in which the long-term outlook is for average use of about two-thirds of its capacity with relatively inadequate provision for future needs having been made during recent periods of maximum production.

The financial story of U. S. Steel from 1902 through 1946, shown in the accompanying table, shows how increases in costs have outstripped increases in prices.

Labor and employment costs in 1902 amounted to $11.03 per ton of ingots produced. In 1946, labor and employment costs were $33.09 per ton of ingots produced, exactly three times the 1902 figure, despite the advances in technology.

To produce 21,287,000 tons of ingots in 1946 required expenditure of $704,500,000 for labor and employment costs; to produce 22,934,000 tons of ingots in 1940 required an expenditure of only $464,300,000.

Meanwhile, steel prices advanced relatively less than the price of labor and of goods and other services purchased. The finished steel composite price at the end of January, 1947, would have had to be 43 per cent higher than it actually was to have kept pace with the average advance since 1940 in the wholesale prices of all commodities as computed by the U. S. Bureau of Labor Statistics.

Chairman Irving S. Olds declares in the report that the corporation "in the discharge of its responsibilities to its stockholders, its employees, and the public, recognizes that U. S. Steel prospers only as the nation prospers" and pledges "anew the maximum use of its resources to help America develop and prosper during what it hopes may be a lasting period of peace."

To this end, the corporation is carry-

UNITED STATES STEEL'S FINANCIAL STORY—1902-1946

(In Millions of Dollars)

Year of Oper.	Products & Services Sold	Employment Costs	Yearly Taxes Accrued	Products & Services Bought	Wear and Exhaustion	Interest & Other Costs on Debt	Income or Loss	Preferred Stock Dividend	Common Stock Dividend	Reinvested in the Business	Total Investment	% Income of Investment
1902	423.1	120.5	2.4	160.8	27.8	21.3	90.3	35.7	20.3	34.3	1,462	7.63
1903	398.2	120.8	3.0	164.1	29.3	25.6	55.4	30.4	12.7	12.3	1,505	5.39
1904	324.9	101.0	3.1	142.3	18.2	30.1	30.2	25.2	.....	5.0	1,505	4.01
1905	409.2	128.1	3.6	151.1	28.0	29.8	68.6	25.2	.....	43.4	1,532	6.42
1906	484.0	147.8	4.4	168.7	35.6	29.4	98.1	25.2	10.2	62.7	1,556	8.20
1907	504.4	160.8	5.4	169.1	35.1	29.4	104.6	25.2	10.2	69.2	1,612	8.31
1908	331.6	120.5	5.4	104.9	23.8	31.3	45.7	25.2	10.2	10.3	1,594	4.83
1909	441.1	151.7	8.7	138.4	31.8	31.5	79.0	25.2	20.3	33.5	1,631	6.78
1910	491.8	175.0	9.2	157.1	32.5	30.6	87.4	25.2	25.4	36.8	1,659	7.11
1911	431.7	161.6	9.6	146.3	27.8	31.1	55.3	25.2	25.4	4.7	1,688	5.12
1912	533.9	189.6	9.8	214.3	33.4	32.6	54.2	25.2	25.4	3.6	1,715	5.06
1913	560.8	207.5	13.2	191.6	34.0	33.3	81.2	25.2	25.4	30.6	1,742	6.57
1914	412.2	162.7	12.6	153.7	26.6	33.2	23.4	25.2	15.2	17.0d	1,750	3.24
1915	523.7	177.3	13.6	189.8	34.3	32.8	75.9	25.2	6.4	44.3	1,784	6.09
1916	902.3	263.9	26.6	265.3	43.0	32.0	271.5	25.2	44.5	201.8	1,990	15.25
1917	1,284.6	347.9	252.3	345.9	83.3	31.0	224.2	25.2	91.5	107.5	2,109	12.10
1918	1,344.6	453.0	297.6	339.2	98.8	30.7	125.3	25.2	71.2	28.9	2,174	7.18
1919	1,122.6	479.7	81.6	364.5	89.9	30.1	76.8	25.2	25.4	26.2	2,209	4.84
1920	1,290.6	581.8	76.2	413.6	80.0	29.3	109.7	25.2	25.4	59.1	2,274	6.12
1921	726.0	333.2	37.7	249.9	40.1	28.5	36.6	25.2	25.4	14.0d	2,255	2.89
1922	809.0	323.4	35.8	334.7	47.1	28.4	39.6	25.2	25.4	11.0d	2,242	3.03
1923	1,096.5	470.4	55.1	377.4	56.9	28.0	108.7	25.2	29.2	54.3	2,283	5.99
1924	921.4	443.6	45.3	266.9	53.2	27.3	85.1	25.2	35.6	24.3	2,291	4.90
1925	1,022.0	458.2	50.9	333.6	61.6	27.1	90.6	25.2	35.6	29.8	2,329	5.05
1926	1,082.3	469.3	52.4	346.7	70.4	26.8	116.7	25.2	35.6	55.9	2,333	6.15
1927	960.5	412.7	46.3	323.1	64.4	26.1	87.9	25.2	49.8	12.9	2,325	4.90
1928	1,005.3	402.9	51.0	338.4	73.2	25.7	114.1	25.2	49.8	39.1	2,330	6.01
1929	1,097.4	410.2	55.0	350.0	69.8	14.9	197.5	25.2	63.8	108.5	2,157	9.85
1930	828.4	371.7	48.1	234.8	63.8	5.6	104.4	25.2	60.4	18.8	2,278	4.83
1931	548.7	258.4	34.2	187.2	50.4	5.5	13.0	25.2	37.0	49.2d	2,214	.84
1932	287.7	138.5	31.7	141.8	41.6	5.3	71.2d	20.7	.....	91.9d	2,110	3.12d
1933	375.0	167.9	31.7	161.4	45.3	5.2	36.5d	7.2	.....	43.7d	2,048	1.53d
1934	420.9	214.8	35.8	140.5	46.4	5.1	21.7d	7.2	.....	28.9d	2,028	.82d
1935	539.4	253.9	38.4	191.2	49.8	5.0	1.1	7.2	.....	6.1d	1,753	.35
1936	790.5	339.0	49.6	287.5	59.0	4.9	50.5	50.4	.....	.1	1,760	3.15
1937	1,028.4	447.1	74.6	342.6	64.1	5.1	94.9	58.5	8.7	27.7	1,801	5.56
1938	611.1	294.4	37.5	228.3	50.3	8.3	7.7d	25.2	.....	32.9d	1,632	.03
1939	855.9	386.5	52.2	303.4	63.4	9.3	41.1	25.2		15.9	1,651	3.05
1940	1,079.1	464.3	68.1	358.3	72.6	13.6	102.2	25.2	34.8	42.2	1,653	7.01
1941	1,622.3	628.3	168.6	604.6	98.6	6.0	116.2	25.2	34.8	56.2	1,733	7.05
1942	1,863.0	782.7	201.3	673.4	128.2	6.2	71.2	25.2	34.8	11.2	1,735	4.46
1943	1,972.3	912.9	125.9	730.6	134.0	6.3	62.6	25.2	34.8	2.6	1,750	3.94
1944	2,082.2	957.2	105.8	814.4	139.0	5.0	60.8	25.2	34.8	.8	1,734	3.79
1945	1,747.3	825.5	66.8	670.1	123.4	3.5	58.0	25.2	34.8	2.0d	1,688	3.64
1946	1,496.1	704.5	69.1	560.4	68.7	4.8	88.6	25.2	34.8	28.6	1,684	5.55

The data are in some respects necessarily approximate, and are based on the yearly earnings reported annually to stockholders without adjustment for surplus charges and credits except that the years 1942 and 1943 reflect renegotiation settlements made in the succeeding years. For example, taxes are as accrued before adjustments. Estimated additional costs arising out of war in the amount of $25 million in the years 1941 to 1944, inclusive, have been included in products and services bought. The item "Employment Costs" includes, in addition to wages and salaries, Social Security taxes after 1935, and pensions after 1910. The item "Wear and Exhaustion" includes amortization of emergency facilities and net loss on sales of plant and equipment, in addition to depletion and depreciation. Income before interest, but after all other charges, was used to determine the per cent income of investment. (d denotes **deficit.**)

ing forward a program of improvements and betterments. At the end of 1945, the corporation had improvements planned or underway requiring an expenditure of $218.6 million to complete. During 1946, additional improvements amounting to approximately $259.9 million were authorized. Against this total of $478.5 million, expenditures during the year amounted to $201 million. At the end of last year, the amount necessary to complete all authorized improvements and additions was $277.5 million.

Such expenditures during 1946 included the purchase price of the various properties acquired from the government, including $65 million for those at Homestead, Duquesne and Edgar Thomson Works in the Pittsburgh district, $40 million for the Geneva steel plant, without inventories, and $5 million for a portion of the equipment of the tube mill at Gary, Ind.

Other improvements include additional open-pit ore mining equipment, continued research in beneficiation of low-grade ores, new mechanized equipment for coal mining, cleaning and blending, new cold reduction equipment at Birmingham, Gary and Pittsburgh, a new bessemer plant and facilities for the production of seamless pipe at Lorain, O., steel fabricating facilities, warehouses and transportation equipment.

National's Construction Program Half Completed

With constructive action by Congress on labor relations, taxation, and cost of government, Ernest T. Weir forecasts continuing good business and fair earnings by industry over the balance of 1947, in the annual report of National Steel Corp., Pittsburgh.

National's net earnings in 1946 were $20,461,651 which compares with earnings in 1945 of $11,117,764. Mr. Weir pointed out that the 8.53 per cent ratio of earnings to sales in 1946 is still below the level of the prewar period from 1936 to 1941, inclusive, when the company's earnings averaged 9.64 per cent of sales.

The extensive construction program underway in the company's various operations is more than half completed, Mr. Weir said. Property additions were made during 1946 in the amount of $27,780,471, and at the end of the year, uncompleted appropriations for the balance of the work amounted to approximately $27 million.

Total sales in 1946 were $239,764,320, comparing with sales in 1945 of $271,832,560, the highest in the history of the company, and the ratio between sales and income before federal taxes was practically the same as in 1945 if the income for 1945 is adjusted to exclude the non-recurring deduction charged in that year for amortization of emergency facilities.

"We may conclude from this," Mr. Weir said, "that the principal reason for increased net earnings in 1946 is not to be found in the higher prices for steel products but rather in lower federal tax rates and the absence of large non-recurring items. The higher prices established during the year were largely offset by increasingly higher costs, which still move upward."

Payrolls in 1946 amounted to $75,190,951, compared with $72,812,293 in 1945. The average number of employees was 25,006, compared with 22,821, and average earnings per employee were $3007, compared with $3191. Average earnings decreased despite higher hourly rates of pay, Mr. Weir said, because of "the reduction in the amount of overtime as peacetime methods of production were resumed, and loss of time and earnings because of strikes in certain operations in which we have dealings with national unions."

Mr. Weir announced that a new subsidiary, the National Mines Corp., has been formed to co-ordinate management of the company's coal properties. Also a site has been purchased in Houston, Tex., for a warehouse and distribution center to provide for expansion of another subsidiary, the National Steel Products Co.

United Engineering Gets TCI Order for Cold Mill

Tennessee Coal, Iron & Railroad Co., Birmingham, has placed an order for a four-stand, four-high cold reduction mill with United Engineering & Foundry Co., Pittsburgh. The mill is to be 54 inches wide. It is expected to have a speed of 3000 feet per minute in the rolling of tin plate stock, and is scheduled to start operations at the close of this year. The cold reduction mill is similar to the unit placed last year with United by Carnegie-Illinois Steel Corp. for its Gary plant.

Wheeling Steel Embarks on $30 Million Expansion

Directors of Wheeling Steel Corp., Wheeling, W. Va., have approved the first division of a large expansion program estimated to cost $30 million. The program, which will increase the company's ingot capacity nearly 800,000 tons annually to around 2 million tons, also involves a battery of coke ovens and improvements to blast furnaces and bessemer converters at the South Works, as well as a new continuous tube mill at the Benwood plant.

Lowered Geneva Freight Rate Acclaimed

Survey conducted in Los Angeles area reveals widespread belief that ICC action will benefit entire country

SOUTHERN Californians welcome the reduction in freight rates from Geneva, Utah, to Coast consuming points, according to C. S. Beesemyer, Los Angeles oil executive and president of the Los Angeles Chamber of Commerce. He reports the consensus of the area's industrialists as revealed by a survey in the district as follows:

The decision of the Interstate Commerce Commission in ruling to enforce a reduction of $4.40 a ton on steel shipments from the Geneva, Utah, mill to West Coast points, furthers an objective which has for years marked the policy of southern California's steel industry.

Because the commission's order included announcement of future investigations of steel rail rates, it is hoped this recent decision will become the basis to which other western steel rates will be related.

Western industrialists base their opinions upon these facts: Steel is the basic material of industry: Los Angeles county and to a lesser degree the entire southern California region has become an industrial area; 240,000 persons work in factories, countywise; the price of steel and its availability are basic factors in its industrial welfare.

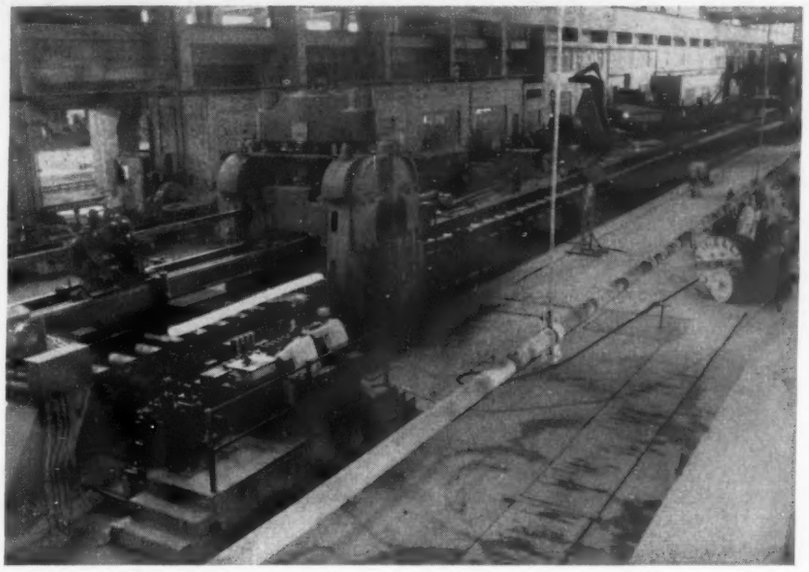
Los Angeles industry pays the highest price for steel among all United States industrial areas.

The majority belief among Los Angeles manufacturers is that the Fontana loan should be reduced, using the sale price of the Geneva mill as a yardstick, so that Fontana and western consumers will not be unduly penalized.

The Fontana mill cannot supply all our needs; we must buy from Geneva also. United States Steel Corp., owner of Geneva, agreed not to charge phantom freight when it bought the mill from the government. But the freight rate from Geneva to Los Angeles by rail was higher than the rate from Baltimore to Los Angeles by water.

Because of this, the railroads serving Geneva and Los Angeles reduced the rate on steel from $14 to $9.60 a ton.

By raising the West's buying power, hundreds of eastern businesses already established in the West will benefit directly.



BRAZILIAN ROLLING MILL: Blooming mill, with shear in foreground, is shown at Volta Redonda, Brazil's new steel plant

Mill Supply Conference Centers Discussions on Merchandising

Joint regional meeting at Philadelphia of American Supply & Machinery Manufacturers Association and National Supply & Machinery Distributors Association takes up problems pertinent to selling under highly competitive conditions in industry

WITH a return to more highly competitive conditions in industry, merchandizing problems of timely interest were presented at the joint regional conference of the American Supply & Machinery Manufacturers Association Inc. and the National Supply & Machinery Distributors Association at the Warwick, Philadelphia, Mar. 25.

Attended by more than 225 persons, the conference was the fifth and last of the season, with previous meetings having been held at Chicago, Boston, Memphis and Cleveland.

At the Philadelphia meeting, as was generally true of the others, particular interest was centered on salesmanship training, sales planning and sales promotion, with views of both manufacturers and distributors presented through formal papers and discussions from the floor. J. G. Geddes, chairman of the Marketing Methods Committee of the American association, presided, while W. W. Kemphert, Sales Methods Committee of the same organization, conducted the informal discussions.

While asserting there is no ready-made formula for salesmanship training that will apply to all companies, J. Tate, director of marketing, the Dunmore Co., Racine, Wis., outlined various broad principles that should be observed, and emphasized that training, as well as sales, should be a joint effort of manufacturer and distributor.

Cost of training, he said, depends upon the technical features of the product or products, and the breadth of the line; he estimated costs might range anywhere from $500 to $1500 per man but pointed out that it costs several hundred dollars just to break in a man without attention to special training and that the difference in the results make it well worth while to provide the special training.

J. J. Simpson, sales manager, Pittsburgh Gage & Supply, Pittsburgh, speaking from the distributor's standpoint, stressed careful screening of applicants and then went on to describe various features of sales training which were desirable in his opinion.

Requirements for a successful distributor's sales meeting were outlined by P. H. Holton, Carboloy Co., Detroit, who presented a paper by K. R. Beardslee, of that company, who was unable to attend, and by M. I. Stray, manager, Industrial Department, J. Russell & Co. Inc., Holyoke, Mass.

Mr. Holton emphasized careful advance planning, and short, snappy meetings, running not more than an hour and a half and usually limited to one subject and one that fits in with the facilities available. He also said the meetings should be considered a means to an end, and not an end in themselves. They must be followed up, he said, with increased sales through joint effort. Mr. Stray thought it was the responsibility of the distributor to make proper facilities available and provide, if necessary, the equipment needed for demonstration, also to make suggestions as to what would prove of interest to his salesman.

There was considerable discussion from the floor as to who should conduct such meeting—the distributor sales head, or the factory technician or representative, with opinion ranging from one extreme to the other. The desirability of training in public speaking for discussion group leaders came up, the point being raised that some of the best thinkers found difficulty expressing themselves upon such occasions.

B. E. Hotvedt, sales promotion manager, Blackhawk Mfg. Co., Milwaukee, outlined a survey designed to guide manufacturers in making a market evaluation, and H. B. Begg, secretary-treasurer, Squier, Schilling & Skiff Inc., Newark, N. J., discussed market evaluation work, asserting it was important to know what the potential was before undertaking sales planning, and also that it was essential that both the manufacturer and distributor co-operate in this effort.

Sales promotion was the subject of interesting remarks by both W. W. French, director of sales promotion, Dodge Mfg. Corp., Mishawaka, Ind., and Ray C. Neal, president, R. C. Neal Co. Inc., Buffalo.

U.S. and Britain Cut Reich Steel Sent to Russian Zone

A joint British-American announcement has reported that British and American authorities have sharply reduced shipments of German iron and steel to the Soviet zone and are considering a total embargo because the Russian zone has failed to fulfill terms of a trade agreement.

The joint statement said the Soviet zone was lagging far behind its commitments under the agreement with the combined American-British zone to deliver foodstuffs and various other materials in exchange for steel and iron. On the other hand, the statement said, deliveries of iron and steel up to the end of February had fulfilled 95 per cent of the British-American commitment.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Eightieth Congress expected to complete "must" legislation in 1947, plus some bills originally earmarked for 1948. National Science Foundation measure may be enacted within next several weeks

DESPITE organizational difficulties, the 80th Congress is tackling its legislative agenda with more than usual efficiency. There now is substantial promise that it not only will complete the "must" legislation on its 1947 program, but that it will approve a number of other important bills which originally were earmarked for action in 1948.

The secret is that the committees, under policy set by the Republican high command, show a definite tendency to settle controversial points before reporting their bills. This is true not only in the House, where teamwork really is on a high level, but also to an unusual degree in the Senate.

This method of procedure has marked the handling of such important bills as those aimed at reducing the Labor Department's appropriation, reducing the individual income tax burden, unifying the armed forces, and protecting industry and the federal treasury against ruinous portal pay awards.

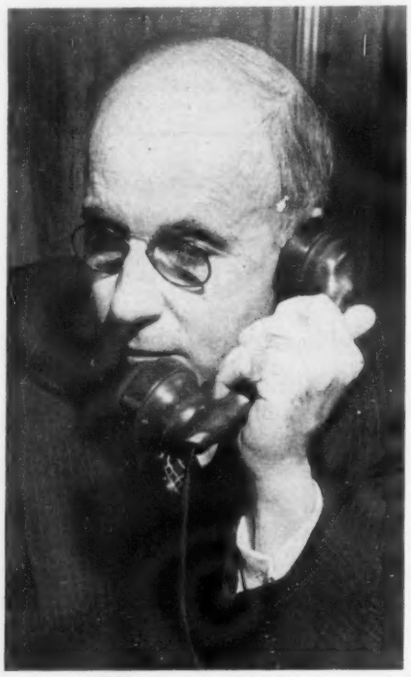
Science Legislation Due

A good example of the present technique is the handling of the National Science Foundation legislation which, while not on the original "must" agenda for this year, now stands a good chance of going on the statute books within a few weeks. The Labor & Welfare Committee which has custody of the bills in the Senate cut through the whole controversial area by requesting the proponents of the two leading bills, Senators Smith and Elbert Thomas, to iron out their differences and bring in a bill on which they could stand together before the committee. The result should be a measure which both the committee and the Senate will find it possible to approve.

On the House side the approach is aimed at promoting similar harmony. There the House Interstate & Foreign Commerce Committee has completed hearings on the House bills and the committee members have been asked to study the viewpoints advanced and otherwise to prepare themselves for an executive session, to be held shortly, at which the committee will decide on the bill it will report on its side of the capitol.

Recent utterances of some of the members of the two committees are regarded as reassuring; the outlook is for a law that will place scientific research under the direction of bona fide scientists, and which will have a patent provision reasonably fair to companies and institutions who in the future will do work for the government.

However, there is a possibility that the national science policy now being formulated will include also a change in our present tax laws with the object of encouraging the expenditure of more private money in scientific research. The House committee was deeply impressed with the recommendation of one witness that the present 15 per cent limit for deductibility of charitable and educational gifts be increased to 20 per cent. This witness was Dr. Frank Jewett, president of the National Academy of Sciences, and former vice president of the American Telephone & Telegraph Co. and director of the Bell Telephone Laboratories. Such an amendment would so increase giving for research work, he said, "that we would be drowned with money."



DR. FRANK JEWETT

The committee, it is expected, will ask the House Ways and Means Committee to give consideration to Dr. Jewett's recommendation.

Housing May Be Exception

An exception to this smooth staging possibly may develop when the matter of a long-range housing program comes up for action. This is another item originally slated to be taken up next year but which, due to widespread demands, is now in the work stage. The measure under consideration is a revision of the Wagner-Ellender-Taft bill that passed the Senate last year too late in the summer for House action. The Senate Banking & Currency Committee has heard both opponents and proponents but the hearings were quite perfunctory; the committee feels that the whole ground was covered so thoroughly last year that only some brief reviews of a "refresher" character were necessary this year.

Outlook is that the committee will report, and the senior house approve, the revised W-E-T bill substantially "as is." Taft's attitude is that the "lowest 20 per cent of the urban population can't get or pay for decent housing" and "I just don't think private enterprise building can take care of this lower-income group." With this view, it seems, a majority of the senators will concur when they cast their votes.

The W-E-T bill is just as bitterly opposed this year as last by the construction industry, the mortgage bankers and other interested groups. It is their hope that the House Banking & Currency Committee will kill House chances for the bill. The House committee is expected to get into the matter as soon as it completes its present study on rent control. The W-E-T bill opponents' attitude is that it will open the way for another unwarranted government spending program. They do not take seriously the claims of the three proponent senators that the bill would stimulate private enterprise.

A typial comment is this from the National Association of Home Builders: "Obviously the proponents of socialized housing are convinced that the only hope of putting public housing over is to tie it in with private enterprise provisions."

There is no question but that the 112-page omnibus housing bill would perpetuate government predominance in the housing field. Under it, the National Housing Administrator would have the power not only to interpret but to establish government housing policy, and he

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sees many

GOOD THINGS AHEAD

It is reported that . . . . . .

Ralph C. Coxhead Corp. of New York has a new Vari-Typer that uses 600 styles and sizes of type, plus foreign language, chemical, mathematical and other symbols.

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Patent 2,409,181 covers a sectional motor truck that can be separated into three pieces and carried anywhere by air.

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Stromberg-Carlson has a new inexpensive adaptor that will enable most owners of pre-war FM sets to receive broadcasts on the new band.

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Frigidaire, Division of General Motors, is making a plastic lid for its ice cream cabinets that is claimed to be 50% lighter than steel.

be ready with CONE for today

New England Carbide Tool Co. is taking tungsten carbide to the housewife in its new precision knife sharpener.

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The State of Minnesota will go into business with Continental Machines, Inc. to engage in a continuous chemical process for the extraction of pure iron from slate formerly wasted at the Mesabi iron range.

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The New Holland Machine Co. of New Holland, Pa., will test its new flame cultivator on truck and garden crops in the Rio Grande Valley this winter.

get ready with CONE for tomorrow

Bell System's first experimental rural radio-telephone circuit connects 8 Colorado farms with the Cheyenne Wells central office. Wind driven generators supply power.

The four largest alternating current motors ever built, 65,000 horsepower each, will be made by Westinghouse for Grand Coulee.

be ready with CONE for today

Lockheed's Little Dipper light plane is reported to cruise at 100 m.p.h. and land at 20.

get ready with CONE for tomorrow

A mobile alcohol plant built into a five car train that could travel from farm to farm was demonstrated at the National Chemical Exposition.

be ready with CONE for today

Phthalic anhydricle, one of the most important ingredients in the manufacture of paints, is now being made from petroleum by Oronite Chemical Company.

Climax Molybdenum Corp. is working on two new high temperature alloys. One has 60% chromium, 25% molybdenum and 15% iron. The other has 60% chromium, 15% molybdenum and 25% iron.

get ready with CONE for tomorrow

The Gyro-Glider developed at the General Electric Flight Test Center has a rotor instead of wings and weighs 120 pounds, ready to fly.

be ready with CONE for today

M. W. Kellogg Co. has a new process for separating a considerable number of useful substances from fish and vegetable oils using liquefied propane at high pressure.

get ready with CONE for tomorrow

The Texas Company's new cold weather aircraft fuel is claimed to start an engine and to permit switching to regular aircraft gasoline in two minutes, in spite of extremely low temperatures.

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The ⅞" 4-Spindle Conomatic, ordinarily assigned to rugged jobs, produced the brass pieces shown in 6 seconds each, including tapping.

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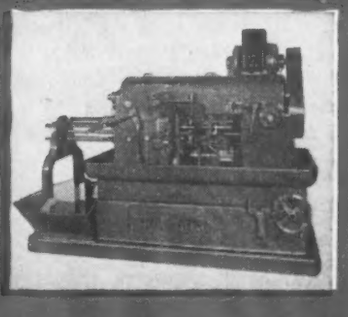


CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U.S.A.

38

would have authority over determination of housing needs, also of the selection of building materials and techniques. He could take steps to increase and make permanent the government's ownership of houses for rent.

One title which has aroused much opposition provides for generous treatment of farmers. If a farmer borrows from the government for erection or repairing of buildings and his income drops so as to make him unable to keep up his yearly payments, his interest can be waived, and his principal payments may be reduced up to 50 per cent.

Those interested in the subject can get an analysis of the revised W-E-T bill by writing to the Senate Banking & Currency Committee, Washington 25, D. C. This committee print compares S 866, the new W-E-T bill, with S 1592, the one that was approved by the Senate last year.

Labor's Power Dwindles

The latest manifestation of the extent to which labor leaders have lost their old power and prestige is reflected by Senator Taft's response to the demand of Philip Murray that Gerard D. Reilly be removed as a consultant of the Senate Labor & Welfare Committee. The CIO chief accused the former member of the National Labor Relations Board of "vindictive antilabor views" and referred to his "known and demonstrated animus toward organized labor."

In brushing off this request, Senator Taft said: "Mr. Murray does not seem to realize that the time has gone by when the CIO can hope to dominate the executive or legislative branch of the government."

Employees Just Redistributed

Senator Byrd, the economy-seeking Virginian who still heads the Joint Committee on Reduction of Nonessential Federal Expenditures as a hangover from the 79th Congress, last year became irate over the employment statistics published by the Civil Service Commission. It reported firings from the government payroll but ignored the simultaneous hirings. For example, the Civil Service Commission recently reported that nearly 1,500,000 employees were removed from the government payroll during the second half of 1946; it did not say anything about the number added to the payroll during the same period.

So the Byrd committee embarked on an extensive investigation and has come up with this conclusion: That most of the government employees let out of one department are promptly taken on by another. It further finds that 12 out of every 14 employees let out in the second half of 1946 were working for the Army or Navy in war jobs.

The Byrd figures show that government employees in January, 1947, numbered 2,261,459 which included 1,276,404 employees in departments and agencies other than the War and Navy Departments. These 1,276,404 employees in January compared with 1,277,403 in December, 1946—a drop in a month of only 999. Senator Byrd has turned these figures over to the House Appropriations Committee which already has started an exodus of government workers by reporting drastically reduced appropriations for the Labor Department and the National Labor Relations Board.

Munitions Board Picks Advisors

Invitations have started to go out from the Army-Navy Munitions Board to men in industry who have been picked for membership on some of the board's industry advisory committees. However, no meetings with these committees are scheduled to be held in the near future. Hence several months may elapse before many of the desired individuals receive their invitations.

According to a recent statement by Richard R. Deupree, board chairman, a good many policy matters will have to be determined before profitable discussions can be held with the industry representatives. In this connection, Mr. Deupree feels that the industrial mobilization procedure in World War II was faulty in certain respects and will have to be corrected before the board is ready to talk with the industry committees.

"We are now in the process of trying to write a manual, or method of procedure, based on the activities of the War Production Board," said Mr. Deupree. "In basic philosophy and basic thinking, we all know there are improvements that can be made. Until we can get our teeth into a specific problem, we are not turning to industry."

But a broad concept of the functioning of the industry advisory committee setup has been established. These committees are to "aid the board in planning for future emergencies, in the creation of an industrial mobilization plan, and also in the Army-Navy Munitions Board stockpiling program."

The first group of industry advisory committees to be organized will be concerned with materials. They will parallel a group of government inter-agency committees on which the board at present relies for advice on stockpiling policy. The government committees have single assignments, such as Iron & Steel, Copper & Copper Base Alloys, Aluminum & Magnesium, Additive Alloys, Fuels, Chemicals, etc. The plan calls for an industry advisory committee to match each of these government committees.

In addition, there is to be a group of industry advisory committees concerned with end products and component parts. These committees will match a group of similar government committees already in existence. These latter committees also have single assignments, as facilities, shipbuilding, ordnance, aircraft, prime movers, transportation equipment, construction supplies and equipment, communications equipment, industrial machinery and equipment, etc.

Thus, each industry will have at least two committees, one charged with study of the materials problems of that industry and the other charged with the study of problems incidental to manufacture of end products. For example, the proposed Iron & Steel Industry Materials Committee will include representatives "of the mining industry, and the forging, casting and milling industries. When the mineral reaches the forged, cast or rough-finished stage and starts its use for a given end item, it ceases to be considered a raw material and falls in the realm of the end products group."

Tighten Atomic Controls

First important act of the new Atomic Energy Commission is imposition, as of midnight Mar. 31, of the tight government control of nuclear energy source materials prescribed by the act. The regulations bring thorium under government control for the first time and tighten existing CPA restrictions on uranium. Beginning April 1, no person may transfer, deliver or receive title to, or possession of, or export, any of the atomic source materials after "removal from its place in nature" without a license from the commission. There are only these exceptions:

Transfers or deliveries may be made of uranium or thorium ores in amounts containing less than 10 pounds of the pure metals per month without the necessity of a license.

Lend-Lease Dies Quietly

On the administration side, the quiet death of the Lend-Lease Administration on Mar. 22 was in contrast with the spectacular career of this agency during and after the war. From the time it was set up by President Roosevelt to assist the British in the early years of the war, it shipped out of the country arms, munitions, food and other supplies valued at more than $50 billion.

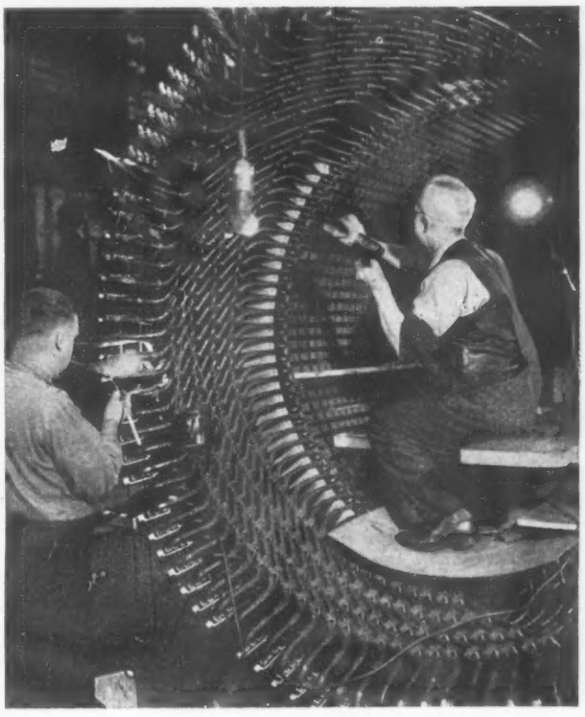
Power Plant Equipment in Big Demand

Builders have orders for one and three-quarters billion dollars worth of generating equipment, sufficient to boost nation's electric power production capacity 15 per cent. Three years will be needed to fill orders on hand; additional ordering expected

By VANCE BELL
Associate Editor, STEEL

TO PROTECT its record of "never too little, never too late," the electric utility industry is embarked on an expansion program which has given the electric generating equipment manufacturers an assignment that will require at least three years for completion.

Already the most powerful nation electrically, the United States will be even more so when one and three-quarters billion dollars worth of electrical generating equipment with a capacity of 13 million kilowatts already on order and sufficient to make a 15 per cent increase in generating capacity is installed. Considering that not more than 20 per cent, or around 2,600,000 kw of the capacity on order, is for replacement of capacity now provided by old or worn-out equipment, the net increase that would come from orders now booked would approximate 10,400,000 kw and would boost the present capacity of all utility companies, municipal and other governmental power agencies and industrial establishments from a combined total of 63 million kw to better than an unprecedented 73 million. Of the 13 million kw capacity now on order approximately 78 per cent is for business-managed public utility companies, as distinguished from government-owned and private industrial plants.



Building of new generators for expanding the nation's electric power production facilities is a job for experts. Shown here at a Westinghouse Electric Corp. plant is a stator being wound for a big turbogenerator. NEA photo

Additional Ordering Expected

In appraising the future, electrical equipment manufacturers estimate that the 13 million kw of capacity now on order will reach 15 million, and perhaps 19 million, to be installed in the next five or six years, the Edison Electric Institute, New York, reports.

While only a small percentage of the new equipment now on order is to replace old equipment it is reasonable to expect that over the next five years there will be considerable replacement, inasmuch as the normal process of replacing obsolete equipment was deferred during the war when demand made it necessary to use all the generating machinery available regardless of its efficiency. An aid to the deferment of replacement was the reasonably good repair in which generating plants were kept during the war.

The installation of additional capacity involves some removal of older equipment in order to utilize available space, but most of the older equipment is left installed for use as reserve or for carrying peak loads.

Need for additional generating capacity, the Edison Electric Institute points out, comes from several sources: 1. Growing industrial use of electricity; 2. rising number of residential customers; 3. substantial increase in residential usage; 4. increased commercial demands; and 5. concentration of load into a relatively short space of time.

In elaborating on those five factors, the institute pointed out that the industrial rate of increase, which was low early in 1946, rose abruptly in August, and continues very high. Part of that increase comes from a high level of industrial activity and part stems from increased electrification of industry, a process which received stimulation during the war and which the institute thinks will go on for several years. Residential customers increased considerably last year, and the consumption per customer rose 8 per cent. Many of the electric companies estimate that the residential load will have increased 50 per cent in the period, 1945 to 1950. Of the increase in residential customers, three-fourths came from suburban and rural areas, and a rural customer produces about 30 per cent more load than the average residential customer. While rural customers will not be a big factor in the increased demand, they will be a substantial one, and the Edison Electric Institute expects demand from them to increase at about the same rate as that from the average residential customer. As to the fourth factor, concentration of load, the institute points out that whereas factories operated around the clock during the war most now work one shift per day five days a week and reach a peak of activity at midweek, necessitating sufficient generating equipment to handle peak demand.

The present expansion program is a continuation of the electric utility industry's policy of long-range planning, a policy that makes electricity available when it is needed, a policy that made possible sufficient power for war production. The war made it difficult for the electric utility industry to procure new equipment and as a result steadily rising demand for electricity in recent months has narrowed the gap between the electric industry's output and capacity. There is still capacity in excess of

consumption but the electric utility industry envisions continued increases in demand and through its present expansion program is preparing for it.

In working to fill the equipment orders from electric utility companies, builders of electric generating equipment are facing the same handicap being experienced by nearly all other manufacturers, namely, difficulty in obtaining materials. Among materials most difficult for electric generating equipment builders to procure in sufficient quantities are steel and copper.

To go further into the present problems and also to ascertain the outlook in the program of providing additional equipment for the electric utility industry, a survey indicates the situation is as follows:

Generating Equipment — The record-breaking volume of orders has filled builders' capacities for from two to three and one-half years on steam-driven generating equipment, with water-driven equipment taking two to three years. Bulk of the orders are for steam-driven equipment, ranging from 60 per cent of the generator business of one company to 83 per cent with another company. While one company said it has not been forced by materials shortages to extend delivery dates, another company reported its delivery dates are continually being influenced, and in some cases extended, because of difficulties in obtaining materials.

One of the builders, Westinghouse Electric Corp., Pittsburgh, has seen its orders on hand for electrical generating equipment grow to a new record. Its shipping schedule for turbine generators above 10,000 kw is filled to capacity until the first half of 1950, according to Tomlinson Fort, manager, Central Station Sales Department. Consequently, turbogenerators ordered now cannot be put into service until the second half of 1950. However, order schedules on ratings 10,000 kw and below are not filled this far ahead, but says Mr. Fort, no general statement can be made as to delivery time for these smaller machines as shipping time varies for various ratings and types of equipment.

"Large motors for auxiliary drives in steam stations require 15 to 20 months for delivery," he reports. "Smaller motors can be shipped in three to eight months less time.

"Larger sizes of water wheel generators ordered now can be scheduled for shipment in the latter part of 1949," Mr. Fort states.

Another builder of generating equipment, which reports delivery dates are being continually influenced and in some cases extended because of materials shortages, says materials it is having difficulty obtaining are iron castings, silicon steel sheets, steel plate, and copper.

Switchgear and Protective Equipment —On assembled metal clad switchgear, Westinghouse has approximately a two-year backlog of orders. Moving of its motor manufacturing operations to a new factory in Buffalo is releasing additional space at East Pittsburgh for switchgear manufacturing.

Delivery time on new orders for large outdoor oil circuit breakers is 18 to 28 months. This time may be reduced in the next six months as expected additional capacity is put into service by Westinghouse. Mr. Fort adds that "on both metal clad switchgear and large outdoor breakers we feel that the maximum shipping time has been reached and that improvement will take place from now on.

"We are quoting about 60 weeks on network protector orders," says Mr. Fort.

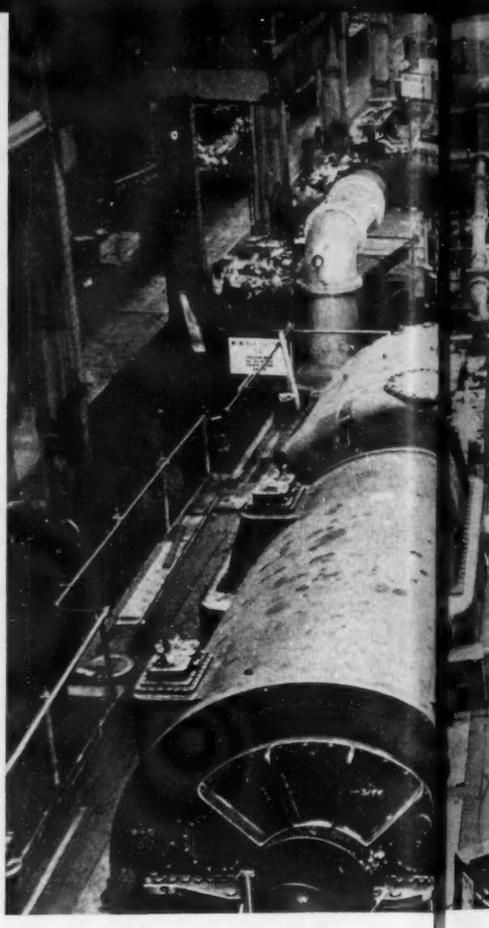
"Shipping dates on high voltage disconnecting switches, power fuses and bus supports are tied in directly with the delivery of high voltage insulators. Due to the large amount of central station construction work going on today, the best deliveries that can be obtained on such insulators is 18 to 24 months.

"Capacitors for pole mounting can be shipped in 2 to 4 months; some designs are even available from stock. For rack mounted capacitors the rack is the limiting item and shipping time is in the neighborhood of one year.

"We have a large backlog of orders for high voltage station type and line type lightning arresters, largely on account of the porcelain situation. Some of the lower voltage porcelains are more readily available so we are quoting shipments from 6 months to one year, depending upon the arrester rating. Distribution arresters can be shipped in approximately 4 to 6 months," Mr. Fort adds.

Transformers — Here too there is a considerable backlog of orders. For power transformers the backlog ranges from 12 to 30 months' production, depending on the company and the size of transformer. For distribution transformers there is a 10 to 24 month backlog, also dependent on the producing company and size of transformer.

Commenting on the transformer situation, Mr. Fort says that in 1942 Westinghouse began to expand its transformer factory at Sharon, Pa. Although those facilities were used exclusively during the war for manufacture of torpedoes the plant has been reconverted for production of transformers. The Westinghouse transformer manufacturing capacity is now almost 50 per cent larger than before the war, and it will be expanded in 1947. However, productive capacity and manpower are available for greater output than can be realized with the existing shortages of materials, Mr. Fort said.

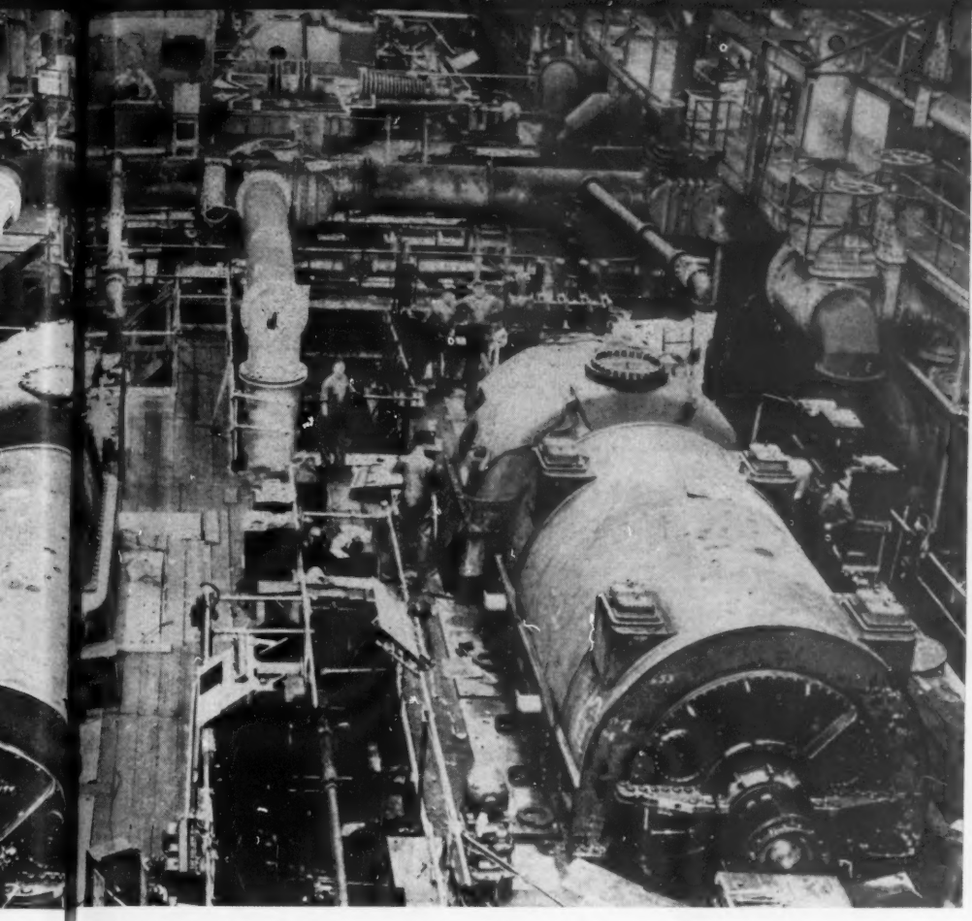


Westinghouse shipping schedules of 21 to 26 months are common for power transformers above 12,500 kilovolt-amperes. In smaller sizes, shipping promises of 19 to 22 months can generally be made.

Normally many standard ratings of distribution transformers are manufactured for stock in quantity and customers' orders are filled from these stock orders. Today, however, Westinghouse manufacturing schedules for transformers 50 kva and below are filled with customers' orders for the next 10 to 24 months, depending upon rating, etc. Larger distribution transformers, up to 500 kva, require 17 to 20 months for production, Mr. Fort said.

Moloney Electric Co., transformer manufacturer at St. Louis, reports the demand for transformers is two to five times the previous peacetime peak. This demand has built up an order backlog ranging from 14 months on 5 to 100 kva ratings to 30 months on 10,000 kva and larger.

Despite insufficient raw materials, the company has boosted production 20 to 30 per cent above its previous peak. Principal raw materials used by the Moloney company are copper and steel, supplies of which are below its requirements for maximum production of transformers. The company's steel needs are sheets,



New steam turbogenerators are being tested at a General Electric Co. plant, Schenectady, N. Y., before being dismantled for shipping. Pipes crisscrossing the area carry steam to and from the turbines. In the left foreground a 35,000-kilowatt turbogenerator, operating at 3600 rpm, is being checked. NEA photo

plates, shapes, and tubing. However, sheets and tubing are particularly critical, the company says.

To process available raw materials, the Moloney company has an adequate labor supply, and even if there is a substantial improvement in supplies of materials the company does not anticipate any problem in obtaining additional help.

Absence of cancellations leads the Moloney company to believe its backlog contains few if any duplicate orders. As a result the company is not trying to guard against future cancellations by overselling its productive capacity. "In our opinion," says G. A. Rulhman, vice president of the company, "transformer production will not catch up with demand for two to three years, even if the freely predicted minor recession materializes."

Also optimistic is M. F. Beisber, manager, transformer sales, Line Material Co., Milwaukee, who says: "We see a tremendous market ahead of us for a period of at least three to five years." Since V-J Day, the company has stepped up its production considerably. Extent to which output can be further increased is determined not so much by the company's productive capacity but by availability of critical raw materials such as magnet wire and alloy steel.

Transmission Towers — To distribute power from the large number of central stations and central station additions now under construction, a large number of transmission towers will be required, the demand for them expected to become active during the coming summer.

American Bridge Co., Pittsburgh, subsidiary of United States Steel Corp., reports that its Shiffler plant specializing in construction of galvanized transmission towers, substations, and radio towers and located in the Lawrenceville district of Pittsburgh, is operating at about one-third of its normal capacity. That rate is considerably below average for the company.

Material and labor supplies for tower construction are not plentiful, but are adequate, according to American Bridge Co. "Costs have risen due to increased prices on materials, particularly zinc for galvanizing, and on bolts and fittings, and there has been a general rise in labor costs. Deliveries at present are in the neighborhood of five to six months, but probably will be extended when larger tonnages come upon the market," the company said.

Wire, Cable — Record-breaking order backlogs exist for electrical wire and cable, and the filling of these orders in a reasonable time is dependent largely on the copper supply, the outlook for which is not bright.

The John A. Roebling's Sons Co., Trenton, N. J., reports its present rate of production of electrical wire and cables, after adjustment for present-day prices, is 80 per cent above 1939 and 30 per cent over the average of 1941-1945, inclusive. "We have been plagued and still are having trouble obtaining sufficient quantities of cotton, plastic, and lead. We have not been in serious trouble on bar copper but the future does not look too bright for that commodity. The domestic supply is not sufficient and the large producers of domestic copper have increased their fabricating facilities sufficiently to absorb all and more than their local mine production," the Roebling company pointed out.

The Roebling company has an order backlog averaging four months' production. However, on magnet wire there is a 6 to 8 months backlog, and for the production of that item the company has an expansion program running over a million dollars for building and equipment.

The Roebling company believes that increased mechanization of industry has boosted the need for electrical wires and cable and that demand will continue indefinitely in excess of prewar requirements.

The Rome Cable Corp., Rome, N. Y., manufacturer of bare and insulated copper wire and cable, has attained the highest operating level in its history. Its order backlog is greater than ever before, although it believes that some of the orders are duplicates.

The Rome company points out it is generally believed that the copper supply, already insufficient, will become critically short about May of this year and probably remain in very limited supply during the rest of the year. Cotton, used in insulations, is not showing much improvement in supply, said the Rome company, adding, however, that the cotton supply is expected to be sufficient for the copper available. Other than copper, the most critical material now, the company says, is polyvinyl thermoplastic compounds. The company has been advised by suppliers of this material that it will be in short supply during most of 1947, although it is expected the supply will become ample in 1948.

Commenting on the future, G. E. Rolston, vice president and sales manager of Rome Cable Corp., says, "we look toward a period of high business activity unless other component materials which are used in connection with wire and cable continue in extremely short supply."

UPPING PRODUCTION by 50%

. . . *Accuracy to ±.0005" at Cincinnati Bickford*

New Bullard MAN-AU-TROL Spacers Eliminate Hole-Locating Jigs and Fixtures

Bullard 4"x 4" MAN-AU-TROL Spacer on 24" Cincinnati Bickford Super Service Box Column Upright... holes drilled, bored, reamed... accuracy of ± .0005" instead of former methods' ± .001" . . . production increased approximately 50%. Comparable results obtained with Bullard 30" x 20" Spacer.

Bullard MAN-AU-TROL Spacers now on production lines are more than living up to advance notices... eliminating jig costs, freeing men for more productive work, increasing volume and accuracy, reducing operators' fatigue. Write for the MAN-AU-TROL Spacer Bulletin. The Bullard Company, Bridgeport 2, Conn.

BULLARD

CREATES NEW METHODS TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Severe March blizzard paralyzes industrial production in Michigan and interrupts high rate of automobile assemblies. Absenteeism runs as high as 90 per cent as workers are unable to get to jobs. Truck shipments snarled

DETROIT

A STAGGERING March blizzard paralyzed industrial production throughout most of Michigan early last week and broke the string of consecutive weekly periods in which car and truck assemblies held above 100,000 units. The essential character of passenger cars and trucks in maintaining operations of plants was forcibly demonstrated by the storm. Absenteeism ran as high as 90 per cent in many smaller outstate plants due to the inability of working forces to get to their jobs. Truck shipments were thoroughly snarled by blocked roads, compelling a considerable reduction in production because of lack of supplies. On one trunk line highway near Albion, Mich., for example, some 40 trucks were counted in one line waiting for the road to be cleared early Tuesday, only a few hours after a truck-trailer unit had jackknifed across the highway in the snow.

Assembly plants in Lansing, Flint, Pontiac and Detroit were slowed for several days from the effects of the weather, thereby cutting the week's total output sharply, probably to around 60,000. In one way, the slowing was helpful since it permitted hard-pressed suppliers to catch up a little on their schedules. At the pace the industry had been operating over the last two months, even a day's respite, or the equivalent of 20,000 assemblies, helps materials sources to move a little closer to the level of their releases.

Packard Introduces '48 Model

Packard's new 1948 model 8-cylinder convertible is being announced this week, and is in every sense of the word an entirely new design, the company having spent nearly $1.5 million in engineering and tooling the project. Of course, there will be other body styles in the series, the convertible being the first to appear probably because the absence of a "hard" top means less sheet steel is required for its production, and less tooling for the body. Quantity production of the convertible will not be possible before June.

Body design features what Packard calls "flush-contour styling," the front fenders being blended smoothly into the body lines and the rear section of the body extending down over the wheels to eliminate the need for separate fender pieces. Raising and lowering of windows is accomplished hydraulically through button controls to the left of the driver. Instrument panel is illuminated by so-called "black light" to minimize glare and reflections. Movement of the front seat also is hydraulically powered, and as the seat moves forward, it rises slightly to maintain back support. Raising and lowering the top likewise is done hydraulically.

Front-end styling is entirely new for Packard, the hood being rounded at the nose and the grille set lower than in earlier models. The conventional Packard contour on the grille is retained and three horizontal bars sweep across the full width of the car just below the grille and above the bumper. Design of the bumper also is new, comprising essentially two parallel horizontal members instead of the standard type of former flat piece.

Engine is a completely new design, delivering 145-horsepower with 327 cubic inches displacement. Bore and stroke of the straight eight are 3⅛ by 4¼ in. Improved acceleration is claimed to result from a changed design in the valves and positioning of the intake manifold, which make the engine an "easier breather."

It was expected Packard's first 1948 models would offer an automatic transmission, since the company is known to have been working on such a unit for some time. However, it was explained the transmission was not being used on the convertible "because it has not yet been developed to our full satisfaction." An overdrive is available at extra cost.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,082*	84,109
March		140,738
April		248,108
May		247,620
June		216,637
July		331,000
August		859,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* *Preliminary.*

Estimates for week ended:

Mar. 8	104,378	23,050
Mar. 15	105,496	35,020
Mar. 22	107,230	37,285
Mar. 29	60,000	43,070

Fancy Models Emphasized

Emphasis on convertibles and station wagons is general throughout the automotive industry. For one thing they bring fancy prices and permit a profit margin not realized in conventional models, and for another, the demand for them has never been as intense as in the past year. Ford's station wagon body plant at Iron Mountain, Mich., is being pushed to the limit and Chevrolet, of course, will soon be in production on station wagon models with bodies supplied from a Fisher plant at Cleveland. Willys-Overland is assembling 750-800 station wagon models weekly at Toledo, and reports continued strong demand for them.

General Motors Reports

Voluminous annual report of General Motors on 1946 operations is being released shortly. Advance details indicate the average number of salaried and hourly-rated employees for the year was 300,634, comparing with 345,940 in 1945 and 303,827 in 1941. Payroll was over $870 million, compared with $1007 million in 1945 and $670 million in 1941. Average weekly earnings of employees over the last nine months of 1946 were $53.93, comparing with $55.90 in 1945 when a 48-hour week was in effect, and $43.41 in 1941 when the work week was slightly over 40 hours.

Approximately one-third of all employees at the close of the year were veterans of World War II, the proportion being higher than that for any other industrial group reporting to the Bureau of Labor Statistics. Automobile workers generally are among the highest paid in the U. S., official figures showing that in October, 1946, the average worker earned $52.80, which is 16 per cent higher than the all-manufacturing average in the country of $45.68 per week. This average paycheck represents a work

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FABRICATING STARTER RING GEARS: Studebaker to keep pace with increased car production, now is making most of its starter ring gears, parts which were purchased before the war. Six rings are spiraled from a 20 ft carbon steel bar. The coil then is sawed and the rings butt welded. Flash is trimmed, the ring annealed, stretched to size and restruck under a 3000 lb hammer. Scrappage is reduced by restriking which assures ring flatness

week of 38.3 hours at an average hourly rate of $1.38, comparing with the rate of $1.12 per hour for the average of all industry.

A sampling of other occupations, according to BLS figures, shows that steel industry employees in blast furnaces, open-hearth plants and rolling mills were paid $50.43 per week average last October, while the 232,000 workers in sawmills and logging camps earned an average of $37.87, and the million-plus employees in the food industry averaged $43.88 weekly.

Dykstra Joins Ford

John Dykstra, who developed plans for the Hudson Body plant and later served as superintendent of sheet metal and body fabricating and assembly there, has been named general production assistant by D. S. Harder, Ford vice president in charge of operations. For the past 13 years, Dykstra has been associated with Oldsmobile, as superintendent of sheet metal, general superintendent, assistant factory manager and manufacturing manager. He is the latest in a long list of former General Motors production executives to join the Ford ranks.

Short in Quality

Many buyers of new cars, in addition to discovering their purchases are costing 50-60 per cent more than equivalent cars in 1939, are finding to their dismay the product is some distance short of prewar models in terms of quality. They find pressed steel sections with waviness which never would have been countenanced before. They find extremely poor fits in sheet metal parts around fenders, hoods and doors. They find mysterious rattles and squeaks which almost defy detection. They find noisy gears and bearings, resulting from a deterioration in materials and manufacturing methods. They find poor plating jobs on many bright parts. They find stainless steel molding sections so thin they can be dented by the kick of a foot. They find assortments of small parts left inside engine compartments, inside doors, under seats and elsewhere.

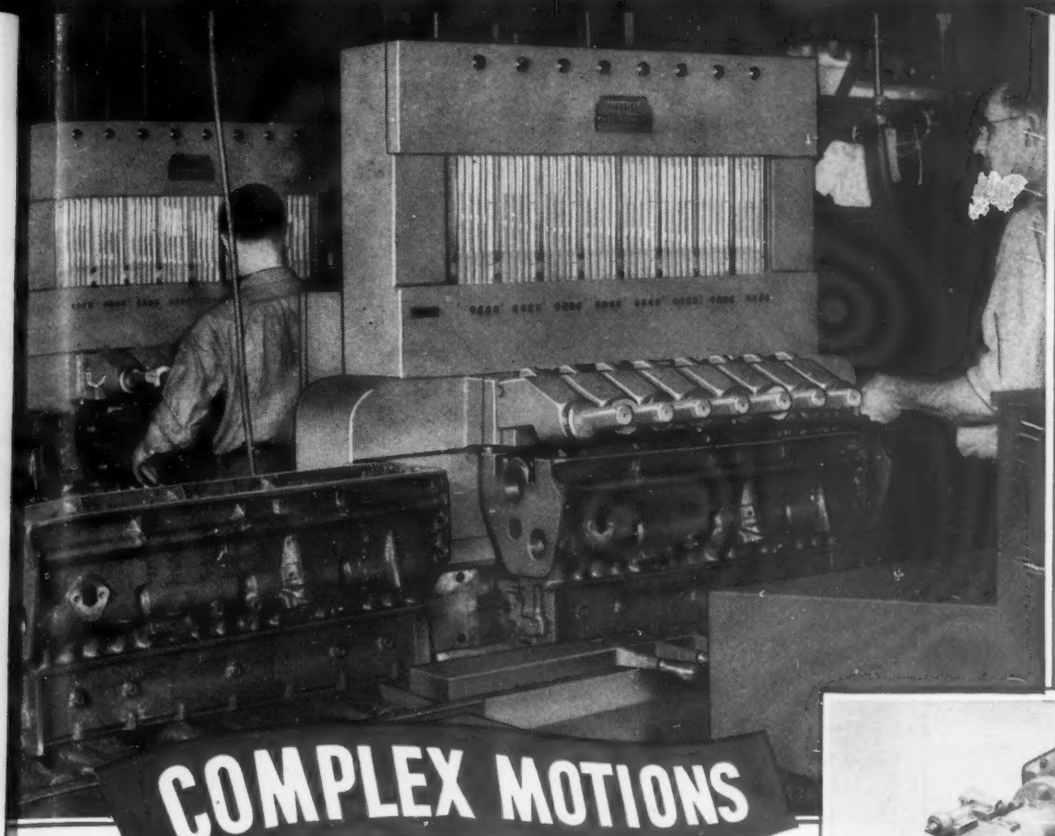
Discovery of these shortcomings leads some buyers to feel they have been taken in a little on their 1946 and 1947 models. It was recognized the first cars to appear after the wartime suspension of production probably would be deficient, but it has now been 18 months since that period, which should have been long enough to restore prewar quality in manufacturing. Admittedly there has been some improvement, but complaints have been numerous and are continuing.

The difficulties are not confined to passenger cars, the Detroit street railways, for example, having been forced to issue stop orders on delivery of more than 800 new busses because of mechanical failures in those placed in operation. Breakdowns in new coaches have been averaging nearly 40 a day, keeping maintenance costs close to 5 cents a mile. General manager of the DSR system declares the mechanical defects cannot be charged to the manufacturers of the busses, but rather to poor quality of materials and parts they buy. Most breakdowns have developed from defective brake interlocking controls, faulty distributors, carburetors, torque converter springs, axles and castings.

While the repair bill on each of the 450 busses now operating has averaged $750 for 15,000 miles of travel, this does not reflect the true picture, inasmuch as the manufacturers have underwritten the cost of most major repairs. Similarly in passenger cars, the manufacturer's warranty usually covers defective parts up to 2500 miles of operation. Replacements of engines, axles, etc., have been much more extensive than ever before and there is seldom any hesitancy over approving them. The trouble is that many complaints are over minor items, more in the classification of annoyances than in serious defects. They are not easily corrected and eventually will likely to be translated into decisions by owners to switch makes on their next buys. Since complaints are not limited to any one producer, the net result in the long run probably will not be serious.

Improves Core Coating

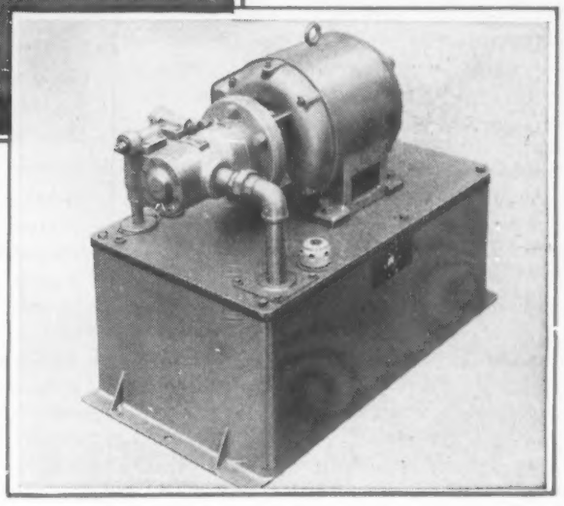
Automatic core dipping and spinning unit is a feature of the new $3 million coreroom now in production at the Ford Rouge plant foundry. Until recently each of the 40-odd sections of the V-8 cylinder block core assembly was dipped separately and dried in ovens before being fitted together. Although paste was used in assembling the sections, there was always the hazard the joints might not be perfect fits, resulting in fins on the inside of the block casting. With the new equipment, the entire core assembly is mounted on a fixture which is attached to a conveyor and carried through a dip tank and then spun to remove excess coating compound.



At Left: Sheffield Precisionaire Gaging Machine simultaneously checking 32 points of inspection.

This is one of a series of applications pointing out the many advantages of Vickers Hydraulic Controls.

Below: Vickers Hydraulic Power Unit installed in base of Sheffield Precisionaire Gaging Machine.



COMPLEX MOTIONS

of this AMAZING GAGING MACHINE

MADE SIMPLE BY

VICKERS HYDRAULIC PUMPS AND CONTROLS

Sheffield Precisionaire Gaging Machine simultaneously measures the diameter at four points in each of 8 cylinders in a motor block—32 points in all. Each bore is then stamped with its true diameter for selective assembly. At the rate of 50 blocks or more per hour, the savings made by this machine have been spectacular.

The machine must make a complex series of motions on each block: (1) ram pushes block into position, (2) two rams from behind push block against stop for accurate transverse location, (3) plunger from above engages hole for accurate longitudinal location, (4) gaging plungers come up simultaneously—one for each cylinder, and (5) withdraw gaging plungers and locating plunger, then return ram.

One push button puts motions No. 1, 2 and 3 (above) into automatic operation; another push button actuates motion No. 4 while a third actuates motion No. 5. To get them all into limited space with proper sequential timing by any other means would have been a difficult problem for the designer. But Vickers Hydraulic Equipment simplified the job. Hydraulic pressure is supplied by a Vickers Power Unit which consists of motor, tank, pump and relief valve all in one compact assembly ready to connect to the hydraulic circuit.

The Vickers Application Engineer nearest you can undoubtedly show you highly satisfactory hydraulic solutions to machine control problems similar to your own.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Inland Will Ship Steel by Water To Milwaukee

Inaugurated for first time since 1931, action disclosed at ICC hearing on comparative freight rates from Chicago

FOR THE first time since 1931 Inland Steel Co., Chicago, will ship steel by lake vessel from Indiana Harbor, Ind., to Milwaukee, the company has disclosed.

Harry C. Brockel, Milwaukee municipal port director, said that Milwaukee has been receiving regular lake steel shipments from Buffalo and intermittent shipments from Cleveland and Detroit. He stated he was hopeful that Inland's action would mean general resumption of Chicago-Milwaukee water movements and that water competition had already resulted in lower freight rail rates from Chicago and Milwaukee to points in Illinois, Indiana and portions of Wisconsin, Iowa and Missouri.

This information was revealed at a hearing in Detroit by the Interstate Commerce Commission on charges pressed by Great Lakes Steel Corp., Detroit, charging 58 railroads with favoritism in the Chicago area in establishing lower rates from there than are quoted from Detroit. R. R. Flynn, Inland traffic manager, testified that water movement to Milwaukee would cost 9.185c per hundred pounds compared with 11c by rail. The 11c rate, applicable only to the Chicago area and to carloads of 80,000 pounds or more, is among those at issue in the action pressed by Great Lakes.

John S. Burchmore, representing the Illinois Territory Traffic League, told the ICC that water transportation forces the Chicago rail rates below those quoted from Detroit, but that even so more and more manufacturers are depending on facilities other than railroads. "The complainants, in effect," he said, "are seeking to raise the rail rates at Chicago."

UNDERGOES STRENGTH TESTS: Budd Co.'s new stainless steel Vista-Dome car is shown undergoing rigid strength tests in the laboratory of the company's Huntington Park Avenue plant in Philadelphia. Laboratory is equipped with a variety of testing machines for both static and fatigue testing of elements and assemblies. Most noteworthy unit is a 2,000,000 lb horizontal testing machine arranged to accommodate cars up to 95 ft in length. On this, the new car demonstrated strength in compression of 1,865,000 lb, far in excess of the Association of American Railroad's requirement of 800,000 lb.

The Vista-Dome car is designed to seat 24 passengers in a raised observation area which overlooks the roof of the entire train and provides vision in all directions. Approximately 90 per cent of the superstructure is spot-welded stainless steel, ranging in thickness from .02 to .2 in. Fabrication and assemblies of the cars are done at company's Bustleton plant, near Philadelphia.

Pittsburgh Company Plans To Manufacture Gas From Coal

Pittsburgh Consolidation Coal Co., Pittsburgh, plans a research and development program to perfect commercial processes for making gasoline and a gas fuel of high heat value from bituminous coal.

With original surveys and fundamental laboratory studies already completed, a $300,000 pilot plant will be built at Library, Pa., in collaboration with Standard Oil Co. of New Jersey which is also participating in the project.

Joseph Pursglove Jr., vice president at Pittsburgh in charge of research, reports the pilot plant will be of "demonstration size" and will be used to perfect and commercialize processes that are already under development on a laboratory scale. It will consume about 50 tons of coal a day, and from this will come a daily production of about 2,400,000 cubic feet of gas suitable for synthesis into liquid fuels and into a gas fuel of high heat value.

"A commercial plant for making liquid fuel and a high-BTU gas might be ready for operation by 1950-51," says Mr. Pursglove, "and could be located within 25 miles of Pittsburgh. One single plant of the size being considered could yield a gas of high value in quantities equal to the output of the Big Inch and Little Inch pipe lines and create a local source of gasoline, diesel and other fuel oils and a certain amount of alcohols. Another advantage would be that low grade coal deposits could be utilized."

Sizable employment gains are visualized for the areas selected for locations of such plants upon perfection of the process. A plant producing gas in quantities equal to the output of the Big and Little Inch pipe lines, would consume about 20,000 tons of coal a day. Mr. Pursglove also points out that the conversion process would be capable of a flexible pattern of production. It could be arranged to produce 400 million cubic feet of gas per day in the winter months and reduce this to half that quantity during the summer when the plant could produce 14,000 barrels of gasoline per day.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

L. E. Meidinger Co. Inc., Milwaukee, has changed its name to Bell Steel Sales. Firm is the Wisconsin sales representative for Jessop Steel Co., Washington, Pa.

—o—

LeMaire Tool & Mfg. Co., Dearborn, Mich., has acquired patents and manufacturing rights of the Sundstrand 3-wheel grinder, formerly made by Sundstrand Machine Tool Co., Rockford, Ill.

—o—

Pesco Products Division, Chicago, Borg-Warner Corp., has started production of hydraulic pumps for industrial use. The division has just completed a $300,000 reconversion and expansion program designed to generalize its production of pumps which during the war was confined chiefly to the aviation industry.

—o—

R. K. LeBlond Machine Tool Co., Cincinnati, has appointed Henry Walke Co., Atlanta, as distributor in Georgia and Farquhar Machinery Co., Jacksonville, Fla., as distributor in central and northern Florida.

—o—

Barium Steel Corp., New York, has sold Jacobs Aircraft Engine Co., Pottstown, Pa., for $1,500,000 to A. R. Jacobs, vice president and general manager.

—o—

United States Steel Corp., New York, has 168,455 common stockholders, an increase of 1023 since Aug. 9, 1946. The corporation has 75,353 preferred shareholders, an increase of 97 since Aug. 5, 1946.

—o—

Edstrand Bros. Inc., New York, has been appointed purchasing agent in this country for Svenska Skifferolje Aktiebolaget, government-owned oil company of Sweden.

—o—

Westinghouse Electric Corp., Pittsburgh, reports that it received orders for more than $60 million worth of products in 1946 from customers in 95 foreign countries. Equipment ranged from household appliances to waterwheel generators.

—o—

Torrington Mfg. Co., Torrington, Conn., will establish a subsidiary at Westfield, Mass., for production of machine needles. To employ 400 to 500, the subsidiary will be housed in a plant formerly occupied by Stanley Home Products Co.

—o—

Minneapolis-Honeywell Regulator Co., Minneapolis, has developed a mercury switch capable of handling almost any switching job. It is rated at one ampere for 115 volts, ac.

—o—

B. F. Goodrich Co., Akron, has opened a new factory in Troy, O., where it will house its Airplane Wheel & Brake Division. Equipment was moved to Troy from the Jackson, Mich., plant of Hayes Industries Inc., whose Airplane Wheel & Brake Division was purchased by Goodrich in 1946.

—o—

Chicago Wheel & Mfg. Co., Chicago, has adopted a new quantity pricing system for grinding wheels. Identical to the system employed for many years on mounted wheels, the set-up abandons the old schedule of discounts.

—o—

Carboloy Co. Inc., Detroit, has appointed Vonnegut Hardware Co., Indianapolis, as a distributor for its line of cutting tools and abrasives.

—o—

Philco Corp., Philadelphia, has purchased 100 million feet of standing timber in North and South Carolina and has installed a modern sawmill with the latest logging equipment in an effort to assure itself of adequate supplies of hardwood for radio and radio-phonograph cabinets.

—o—

Oldsmobile Division, Detroit, General Motors Corp., reports that one half of its cars delivered in 1946 by authorized dealers were sold without trade-ins. Eight per cent of its total sales went to members of the medical profession, 7.3 per cent were purchased by personnel in public service departments and 28.6 per cent went to veterans.

—o—

Nash Motors Division, Detroit, Nash-Kelvinator Corp., has published three books dealing with technical auto service information which will be used as texts in vocational schools throughout Baltimore.

—o—

Solar Aircraft Co., San Diego, Calif., has received an $85,000 order from Fruehauf Trailer Co., Detroit, for 15 stainless steel milk transport tanks.

—o—

Luscombe Airplane Corp., Dallas, Tex., has lowered the price of its all-metal Silvaire model to $2495, a reduction of $500.

—o—

Special Products Division, Cincinnati, Lodge & Shipley Co., has appointed the following Canadian distributors for its garden tractor: Finning Tractor & Equipment Co., Vancouver, B. C.; Hardie Agencies Ltd., Charlottetown, Prince Edward Island; F. Manley & Sons, Toronto, Ont.

—o—

Vacuum Cleaner Manufacturers' Association, Chicago, announces that factory sales of standard-size cleaners totaled 272,927 for February, 1947, an all-time high. Sales were 126 per cent greater than in February, 1946.

—o—

Loewy Construction Co. Inc., New York, has receieved a $10 million order for the installation of a rolling mill in Sweden. Designed to turn out 700 million pounds of rolled steel per year, the plant will be in operation in 1949.

—o—

Mathieson Alkali Works, New York, estimates the cost of its modernization and expansion program at $9,500,000, and this does not include alteration of the recently acquired government ammonia plant at Lake Charles, La. Started in 1945, the program will be completed late this year.

—o—

Ferro Enamel Corp., Cleveland, announces a $200,000 expansion program. Bulk of the appropriation will be for new furnaces, ball mills, dryers and other processing equipment.

—o—

Mullins Mfg. Corp., Salem, O., fabricator of sheet and strip metal products, is considering installing standby equipment for its furnaces so that other fuel can be used when the gas supply fails. Estimated cost is $200,000.

—o—

Win Mfg. Co., Portland, Oreg., newly formed for the manufacture of sheet metal products, has purchased a 200 x 370-ft property lying between Harbor Dr. and Front Ave. for $100,000. Included in the property was an L-shaped building used in war days by Iron Fireman Mfg. Co.

—o—

Handy & Harman, New York, refiners of precious metals, have opened a manufacturing and service plant in Los Angeles with H. A. Folgner as manager.

—o—

Cooper-Bessemer Corp., Mount Vernon, O., has received an order from India for eight 2750-hp industrial compressors to be used in production of sulphate of ammonia for fertilizer purposes.

—o—

American Locomotive Co., New York, is offering for sale two plant buildings and all property west of Roberts Rd., at its Dunkirk, N. Y., branch. Both buildings have been idle for a number of years.

The Business Trend

New Postwar Peak Set By Industrial Activity

REFLECTING continued gains in industrial activity, STEEL's industrial production index in the week ended Mar. 22 attained a new postwar high level of 163 per cent (preliminary) of the 1936-1939 average. This is a one-point rise over the preceding week's 162, the previous peak.

However, a decline for the week ended Mar. 29 is anticipated as a result of storms which hampered industrial operations in the eastern half of the nation.

STEEL—A strong factor in the recent high rate of industrial activity has been steel ingot production, which in the week ended Mar. 22 touched a new postwar peak of 96.5 per cent of capacity. At the same time a ray of encouragement pricewise came from the steel industry when a major producer announced revision of extra charges, which in the aggregate results in moderate price reductions.

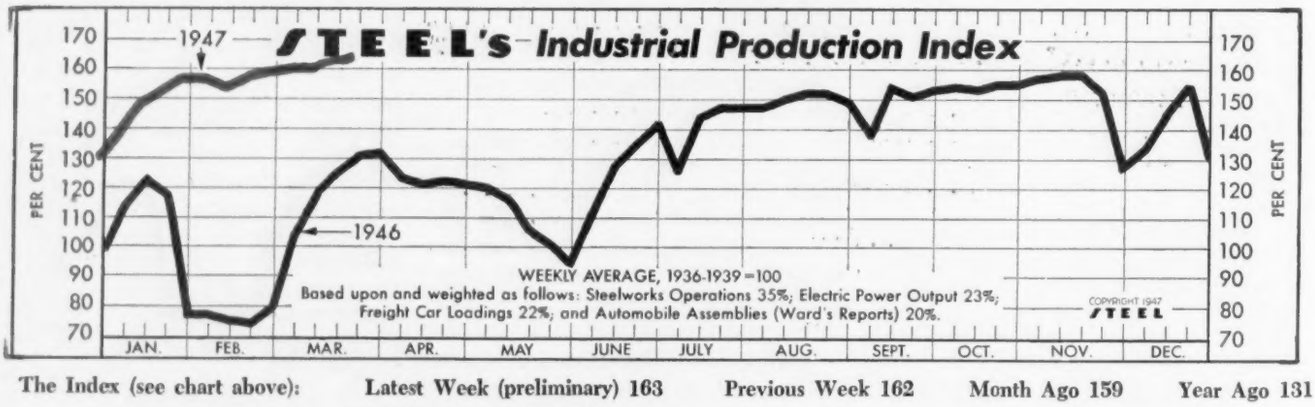
AUTOS—Also helping materially to maintain the high rate of industrial production is the auto industry, which in the week ended Mar. 22 turned out an estimated 107,230 passenger cars, trucks and busses, thereby setting a new postwar record. That was an increase of 1734 units over the preceding week.

COAL—Bituminous coal production in the week ended Mar. 15 climbed to an estimated 13,140,000 tons, highest since the week ended Feb. 1. Output in the week ended Mar. 8 was 12,780,000 tons. Production this year through Mar. 15 was estimated to be 2,102,000 tons, or 1.6 per cent, ahead of that for the corresponding period of 1946.

CONSTRUCTION—Despite high construction costs, civil engineering construction contracts awarded in the week ended Mar. 20 totaled $109,080,000, an amount exceeded in only three other weeks of this year. Total engineering construction awards for the first 12 weeks of 1947 amount to $1,127,744,000, up 33 per cent over the corresponding period of 1946.

RAILROADS—Advance reports from 87 class 1 railroads indicate railroad operating revenues in February increased 9.1 per cent above the corresponding month of 1946. Estimated freight revenue in February was up 22.9 per cent but estimated passenger revenues, continuing downward, were off 39.4 per cent from February of last year. February freight traffic has been estimated at 50 billion ton-miles, a 3½ billion decline from January, 1947, but nearly 5 billions over February, 1946.

PRICES—Following five weeks of steady advances, the wholesale commodity price index of the U. S. Bureau of Labor Statistics declined 0.3 per cent in the week ended Mar. 15 because of lower prices for some foods. At 148.3 per cent of the 1926 average, the index was 3.6 per cent above mid-February and 36.8 per cent above a year ago. Although some food prices declined, average prices of all commodities other than farm products and foods continued their steady advance and edged up 0.5 per cent in the week ended Mar. 15.



The Index (see chart above): **Latest Week (preliminary) 163** **Previous Week 162** **Month Ago 159** **Year Ago 131**

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.5	95.0	94.5	88.5
Electric Power Distributed (million kilowatt hours)	4,759	4,764	4,778	4,017
Bituminous Coal Production (daily av.—1000 tons)	2,190	2,130	2,058	2,202
Petroleum Production (daily av.—1000 bbls.)	4,862	4,844	4,786	4,431
Construction Volume (ENR—Unit $1,000,000)	$109.1	$103.3	$98.5	$105.9
Automobile and Truck Output (Ward's—number units)	107,230	105,496	103,400	37,285

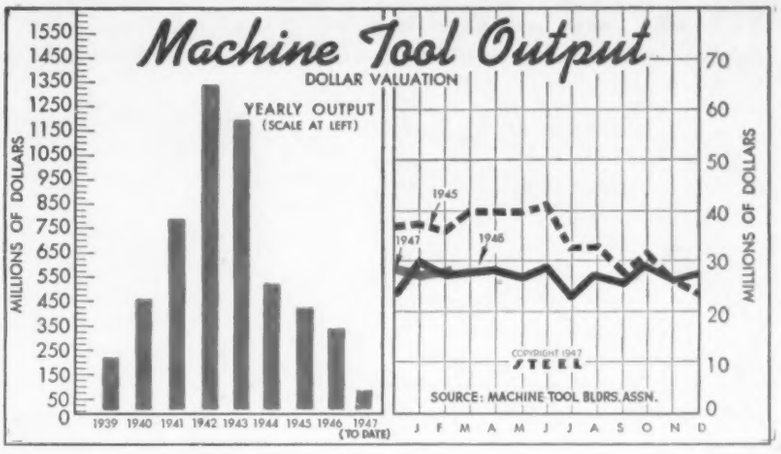
* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

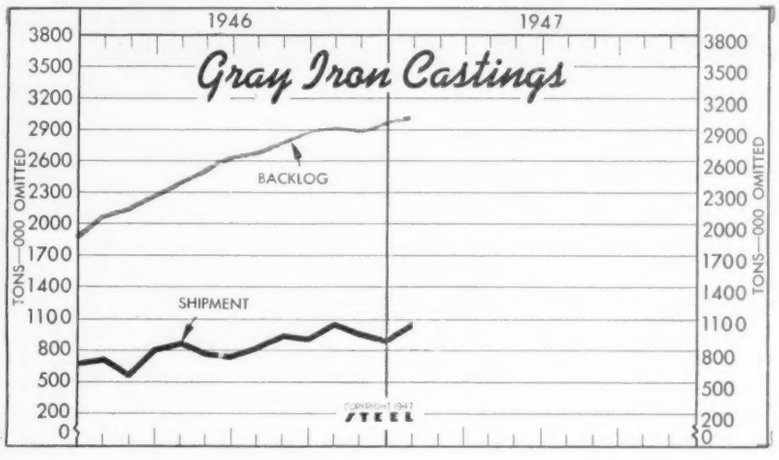
TRADE				
Freight Carloadings (unit—1000 cars)	845†	841	777	805
Business Failures (Dun & Bradstreet, number)	47	51	58	22
Money in Circulation (in millions of dollars)‡	$28,242	$28,330	$28,276	$27,889
Department Store Sales (change from like wk. a yr. ago)‡	+10%	+9%	+17%	+13%

† Preliminary. ‡ Federal Reserve Board.

Machine Tool Shipments
(000 omitted)

	1947	1946	1945	1944
Jan.	$26,542	$30,263	$37,353	$56,363
Feb.	26,594	26,949	36,018	50,138
Mar.	.....	27,326	40,045	51,907
Apr.	.....	28,108	40,170	41,370
May	.....	26,580	39,825	41,819
June	.....	28,580	41,040	41,471
July	.....	22,360	32,504	32,753
Aug.	.....	26,911	32,500	35,177
Sept.	.....	25,468	27,300	35,889
Oct.	.....	29,140	31,200	37,516
Nov.	.....	26,176	26,084	36,277
Dec.	.....	27,587	23,276	36,784
Total	.....	$325,448	$407,315	$497,464





Gray Iron Castings
(U. S. Bureau of Census)
Tons—000 omitted

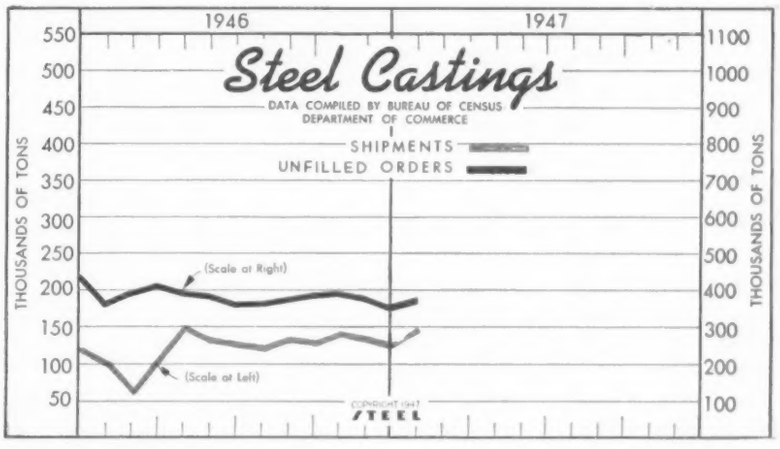
	Shipments		Backlogs*	
	1947	1946	1947	1946
Jan.	1,056	706	2,986	2,077
Feb.	....	541	....	2,153
Mar.	....	796	....	2,265
Apr.	....	857	....	2,378
May	....	757	....	2,492
June	....	735	....	2,633
July	....	811	....	2,669
Aug.	....	945	....	2,786
Sept.	....	914	....	2,882
Oct.	....	1,051	....	2,916
Nov.	....	964	....	2,888
Dec.	....	889	....	2,952
Mo. Ave.	....	830	....	2,591

* Unfilled orders for sale to the trade.

Commercial Steel Castings
(Net tons in thousands)

	Shipments		Unfilled Orders*	
	1947	1946	1947	1946
Jan.	147.9	99.1	369.4	358.9
Feb.	....	57.4	....	390.1
Mar.	....	101.4	....	412.3
Apr.	....	146.3	....	392.8
May	....	129.2	....	381.7
June	....	123.6	....	361.3
July	....	119.2	....	362.6
Aug.	....	130.4	....	374.7
Sept.	....	126.4	....	384.0
Oct.	....	138.2	....	389.0
Nov.	....	130.8	....	378.6
Dec.	....	122.2	....	353.9

* Castings for sale.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,877	$11,984	$13,879	$13,069
Federal Gross Debt (billions)	$258.9	$260.8	$259.4	$276.7
Bond Volume, NYSE (millions)	$16.6	$17.3	$15.2	$24.0
Stocks Sales, NYSE (thousands)	3,739	4,808	4,579	6,370
Loans and Investments (billions)†	$55.6	$55.4	$55.3	$67.7
United States Gov't. Obligations Held (millions)†	$35,300	$35,301	$35,150	$49,088

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.73	$63.54
All Commodities†	148.3	148.7	143.1	108.4
Industrial Raw Materials†	164.1	162.5	154.3	121.0
Manufactured Products†	142.1	143.7	139.1	104.3

† Bureau of Labor Statistics Index, 1926=100

Men of Industry

Robert G. Dunlop has been elected president of the Sun Oil Co., Philadelphia, to succeed **J. Howard Pew,** who has retired after 35 years as president of the company. **Joseph N. Pew Jr.** has been named chairman of the Sun Oil board. He has been a vice president and a director since 1912. **Clarence H. Thayer,** chief engineer, has been elected a vice president, and **Donald P. Jones,** assistant controller, has been promoted to succeed Mr. Dunlop as controller.

—o—

C. L. Hewett Jr. has been appointed general sales manager, L. J. Mueller Furnace Co., Milwaukee. He has returned to the company after an absence of five years. He had served, at one time, as eastern sales manager of the firm, and has recently been associated with the Rheem Mfg. Co., San Francisco, as sales manager of the Heating Equipment Department.

—o—

Wayne Finn, formerly office manager, Marchant Calculating Machine Co., Oakland, Calif., has been appointed treasurer of the company.

—o—

W. E. Curran has been named general manager of Rheem Mfg. Co., San Francisco. He is also a vice president and director. He will continue to make his headquarters in New York.

—o—

J. J. Murray, formerly associated with the Heltzel Steel Form & Iron Co., Warren, O., has joined the Falls Welding & Mfg. Co., Newton Falls, O. He has been named general manager of the company.

—o—

Philip S. Morris, formerly executive vice president and general manager of the McQuay Aircraft Corp., and of Plexweve Mfg. Co., both of Los Angeles, has been appointed assistant to the president of McQuay Inc., Minneapolis. **Blake Thomas,** formerly general sales manager, Chronomatic Corp., has been named assistant general sales manager.

—o—

Walter Wiewel, assistant to the president, National Tube Co., Pittsburgh, has resigned to become president of the Trent Tube Co., East Troy, Wis. **H. E. Passmore,** sales manager, Christy Parks Division of National Tube, also resigned recently.

—o—

A. S. Folk, Pittsburgh Plate Glass Co., Baltimore, has been elected president of the American Brush Manufacturers Association. He succeeds **Milton W. Alexander.** Other officers elected are: **W. E. Hill,** first vice president; **W. L. Campbell,** second vice president; **A. W. Barlow,** treasurer; **G. A. Fernley,** advisory secretary; **H. R. Rinehart,** executive secretary; and **R. C. Fernley,** secretary.

LYNDON C. COLE

DONALD M. PATTISON

—o—

Lyndon C. Cole has been appointed chief engineer, Machine Division, Osborn Mfg. Co., Cleveland. He had previously been associated with the Cleveland Automatic Machine Co. as chief engineer, and the Cleveland engineering office of the Hydraulic Press Mfg. Co. In his new position, Mr. Cole will have charge of engineering and design of Osborn's Foundry Equipment Division.

—o—

Robert L. Miller, formerly assistant sales manager of the Road Machinery Division, Heil Co., Milwaukee, has been appointed district sales manager for all Heil products in Iowa, Missouri, Nebraska, Kansas and Colorado. He will have his headquarters at Kansas City, Mo. Mr. Miller has been associated with the Road Machinery Division since its inception 12 years ago.

—o—

The Conlon-Moore Corp., Chicago, formed by the recent merger of the Conlon Corp. and Moore Corp., has announced election of following officers: **Bernard J. Hank,** president and treasurer; **Louis R. Peyla,** vice president; **I. N. Merritt,** vice president and general manager, Conlon Division, Chicago; **Harry T. Worthington,** vice president and general manager, and **John M. Fox,** vice president in charge of sales, Moore Division, Joliet, Ill.; **J. J. Hank,** vice president and general manager, Dickinson-Brightin Foundry Division, Chicago; **Herbert H. Kennedy,** secretary.

—o—

G. N. Kirkpatrick has been elected chairman of the board of Landis Machine Co., Waynesboro, Pa. **J. H. Elliott** has been elected president and general manager, and **R. G. Mumma** has been appointed secretary of the company.

—o—

Donald M. Pattison, general sales manager, Warner & Swasey Co., Cleveland, has been elected a director of the company, and also vice president in charge of sales.

—o—

Dwight M. Wilkinson, formerly chief engineer, Industrial Ovens Inc., Cleveland, has become affiliated with Ovens for Industry Inc., Cleveland, as president of the company.

—o—

Fred C. Margolf, recently manager, Home Laundry Sales Division, Hotpoint Electric Co., Chicago, has joined Iceberg Refrigerated Locker Systems Inc., as general sales manager.

—o—

C. Stephen Welch has been named assistant to the executive vice president, Westinghouse Electric Supply Co., New York. **H. H. Black** succeeds Mr. Welch as assistant auditor.

—o—

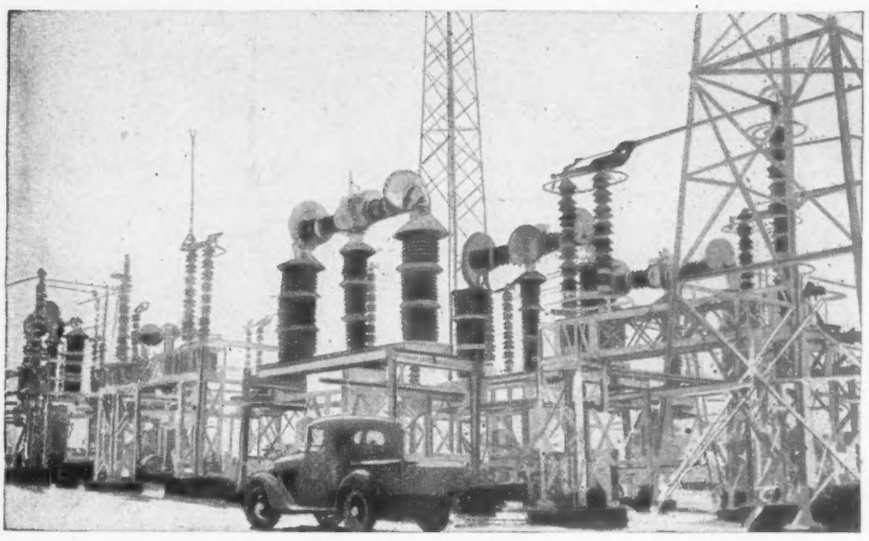
Col. H. W. Robbins has retired as safety engineer of Norton Co., Worcester, Mass. He is succeeded by **John Hychka,** formerly of the company's plants engineering department. Mr. Robbins has been associated with the Norton Co. for 31 years.

—o—

In recognition of their scientific work, particularly on the structure of light alloys, **Dr. J. L. Haughton** and **Dr. Marie L. V. Gayler (Mrs. Haughton)** have been, jointly, presented with the British Institute of Metals' platinum medal, at the 30th annual general meeting of the Institute, which was the first to be held

HARPER fastening NEWS

INDUSTRY EYES MAINTENANCE COST



Electric Utilities Demand Endurance at Low Cost

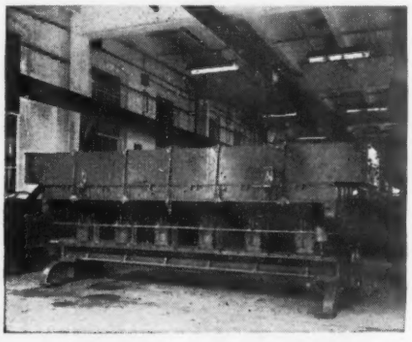
Thousands of miles of power lines which feed countless homes and industries throughout the country must be built as inexpensively as possible yet with rugged endurance to stand weather conditions and severe strains.

This low cost is achieved in the connectors, switches, tower hardware, underground junction boxes and many other details through the use of non-ferrous fastenings. Bolts, nuts, washers and screws that will not rust or corrode and can be used again and again to achieve low maintenance cost.

These fastenings of silicon bronze, and other alloys have great strength and can be depended upon to hold securely.

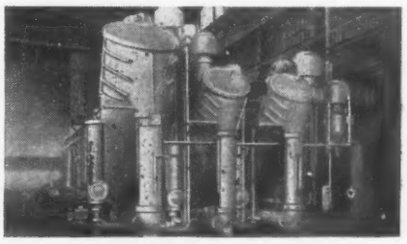
PULP and PAPER MACHINERY MUST BE TOUGH

A packer screen which separates knots and extraneous matter from the pulp solution before drying and forming, in the manufacture of paper, is jogged 600 times per minute against heavy loads. Vital bolts and screws which must stand this strain yet be constantly free for removal in servicing are of Harper non-ferrous and stainless alloys.



FOOD PRODUCTS CORRODE COMMON METALS

Food industries are particularly trying on metals. Most foods themselves have highly developed cor-



rosive properties, yet it is essential that all containers be free from corrosion as is this evaporator equipped with Stainless Steel bolts, nuts, etc.

The H. M. HARPER COMPANY
2646 Fletcher Street
CHICAGO 18, ILLINOIS

Branch Offices—New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas

HARPER *Chicago*

HARPER SPECIALIZES IN EVERLASTING FASTENINGS

since the war. Dr. Haughton has just retired from the post of principal officer of the scientific and research department of the National Physical Laboratory, Teddington, where his wife had been associated with him in his research work. They are now acting as consultants specialized in nonferrous metallurgy.

—o—

Ladish Co., Cudahy, Wis., has announced the establishment of a new district office in Atlanta, and the discontinuance of its New Orleans office. **W. W. Bowie**, formerly manager of the New Orleans office, has been appointed manager of the Atlanta office to direct the sale of the complete line of Ladish controlled quality seamless welding fittings, Ladish forged steel fittings and Ladish forged steel flanges. The new office will be located at 452 Spring Street, N. W., and will service the southeastern territory.

—o—

C. E. Wolliever has been appointed director of personnel of the A. O. Smith Corp., Milwaukee. He has been engaged in personnel work for 20 years.

—o—

J. S. McMahon has been appointed superintendent of blast furnaces, The Steel Co. of Canada Ltd., Hamilton, Ont.

—o—

Robert W. Purcell has been elected vice chairman of Alleghany Corp., Cleveland. He has previously been vice president and director of Alleghany, and also vice president-law of the Chesapeake & Ohio Railway Co.

—o—

C. O. Worden Jr. has become associated with the consulting laboratory of Carl A. Zapffe, metallurgist, Baltimore, as associate research metallurgist on special problems. He had previously been with Rustless Iron & Steel Division, American Rolling Mill Co., the Naval Research Laboratory, and the Glenn L. Martin Co., Baltimore.

—o—

Charles F. Venrick has been appointed Pacific Coast district sales manager for the American Locomotive Co., San Francisco. He will succeed **Stephen G. Harwood**, who has been transferred to New York as district sales manager for the Atlantic Coast.

—o—

Walter A. Vahle has been appointed assistant to the director of purchases and traffic, Monsanto Chemical Co., St. Louis. **Harry F. Klocker** has been appointed general traffic manager to succeed Mr. Vahle.

—o—

Darrell Taylor has been named maintenance manual editor for Twin Coach Co., Kent, O. He had formerly been with the publications branch of General Motors Corp.

—o—

Robert H. Frazier, formerly a metallurgical engineer with the National Tube Co., Pittsburgh, has been appointed to the staff of Battelle Memorial Institute, Columbus, O. He will engage in research in steel processing.

—o—

J. F. Herr has been appointed to be in charge of a branch office, recently opened at Fairlawn, N. J., by the Standard Plating Rack Co., Chicago. The office, located at 22-02 Raphael St., will serve the middle Atlantic and New England states in the manufacture of insulated plating racks for all types of metal finishing.

—o—

John F. Chester has resigned as general business editor of the Associated Press to become director of public relations for the Carrier Corp., New York.

—o—

Kuno Doerr Jr. has been appointed manager of the Helena, Mont., refinery, American Smelting & Refining Co., New York. He succeeds **E. M. Tittman**, who has been transferred as manager of the El Paso, Tex., plant.

—o—

Laurence Wenz has been elected assistant controller of the International General Electric Co., Schenectady, N. Y. He will have headquarters in the Schenectady office.

—o—

Harold L. Posner has been named president of Pallet Sales Corp., New York, succeeding the late **Mortimer A. Lowe**, founder of the parent organization, Pallet Sales Co. Mr. Posner had been associated with the Pallet Sales Co. in its early days, but had resigned to enter government service, and later engaged in war production work. **Curtis H. Barker Jr.** has been named vice president and director of research and service. During the war he served as technical director of the field operations branch of the U. S. Navy Department. He had previously been associated with the General Electric Co. in the Bridgeport plant.

—o—

John M. Bastion has been appointed export sales representative of the Goodyear Tire & Rubber Co. He will have headquarters in San Francisco. He will be in charge of the company's complete line of export items, including tires, tubes, mechanical goods, chemical and shoe products.

—o—

Frederick E. Munschauer Jr. has been appointed works manager of Niagara Machine & Tool Works, Buffalo.

—o—

Dr. Melville F. Peters, formerly in charge of research at Titeflex Inc., Newark, N. J., has been appointed chief engineer of the company. In addition to these duties, he will continue to direct basic research on Titeflex products.

—o—

The Liquid Conditioning Corp., Linden, N. J., has announced the appointment of L. S. Luther & Co. as engineering sales and service representatives in the District of Columbia, most of Virginia, and most of Maryland. The Luther organization is headed by **Lloyd S. Luther. W. Norman Meyer** is the company's mechanical engineer. Headquarters of L. S. Luther & Co. are at 1018 Eighteenth St., N. W., Washington 6.

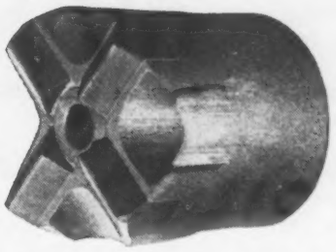
—o—

At the annual meeting of the British Institute of Metals in London, the first to be held since the war, the following officers were elected: **Col. P. G. J. Gueterbock**, director of Copper Pass & Son Ltd., Bristol, has been elected president for the second quarter in succession. **John Cartland**, director of Fry's Metal

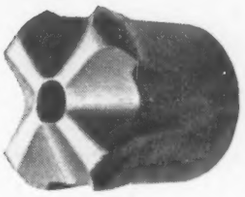
HAROLD L. POSNER

CURTIS H. BARKER JR.

Penetrating hard rock is easier, faster and less costly with the remarkable new Carboloy-Set 4-point Jackbit for blast hole drilling all rock formations. Developed by Carboloy Co. and Ingersoll-Rand, this new bit for percussion drilling lasts many times longer, shows tremendous shock-resisting abilities. Just another accomplishment of the hardest metal made by man.



Actual-size photograph of the new 4-point Carboloy-Set Jackbit.



1. Two feet of drilling in granite dulled the old type steel bit as shown above. Compare this with the . . .

2. . . . Carboloy-Set Jackbit after drilling 249½ feet in granite! More than 100 *times* longer life!

Turning hard rock to butter

GREAT NEWS of Carboloy Cemented Carbide for the mining industry and others who drill blast-holes in rock! The new Carboloy-Set Jackbit for percussion drilling substantially increases footage drilled per shift, and permits continuous drilling with one size bit, heretofore impossible.

Such performance comes from Carboloy's remarkable density and great shock-resistant qualities in cutting hard materials such as rock and metal.

A Versatile Product

In many fields, Carboloy* is proving every day its reputation among authorities as *one of the ten most important industrial developments in the last decade.*

With Carboloy, industry today in countless operations can remove more material at higher speeds than was once thought possible.

Here's why Carboloy Cemented Carbide is so important in so many production uses:

1. **Carboloy commonly triples the output of both men and machines,**
2. **Cuts, forms or draws the toughest, most abrasive modern alloys with accuracy and speed previously unknown, and**
3. **Regularly increases the quality of products.**

As a tool, die or wear-resistant machine part, Carboloy is too important to overlook. It's time you investigated.

Carboloy Company, Inc., Detroit 32, Michigan

CARBOLOY

*(TRADE MARK) CEMENTED CARBIDE

THE HARDEST METAL MADE BY MAN

Foundry Ltd., London, has been elected vice president. The following were elected as members of the Council: **Prof. Leslie Aitchison, John Arnott, Dr. Maurice Cook** and **A. J. Murphy.**

—o—

Walter V. Trelease has been appointed manufacturing representative in charge of sales and product development of All American Aviation Inc., Wilmington, Del. He had previously been associated with Kellett Aircraft, Philadelphia.

—o—

Clark M. Wright has been named assistant manager of the Turbine Division, General Electric Co., Schenectady, N. Y. He was formerly sales engineer in the Chicago office. Mr. Wright has been a turbine specialist with General Electric for many years.

—o—

William H. Wills, metallurgical engineer at the Dunkirk, N. Y., plant, Allegheny Ludlum Steel Corp., Pittsburgh, addressed the Western Metal Congress and Exposition at Oakland, Calif., March 25. His subject was "Tool Steels."

—o—

John J. Carroll has been appointed sales representative in Venezuela for the Standard Transformer Co., Warren, O. His headquarters will be in Caracas, Venezuela.

—o—

Eli Mullin, attorney-at-law and consulting engineer, has transferred his headquarters from 1525 E. 53rd St., Chicago, to 134 N. LaSalle St., Chicago 2, continuing in the practice of patent, trademark and copyright law.

—o—

Two new sales representatives have been appointed by the Bright Light Reflector Co. Inc., Bridgeport, Conn. **Harry A. Miller,** Dallas, Tex., will cover the states of Arkansas, Oklahoma and Texas. **Donald S. Gleason,** Seattle, has been assigned a territory embracing Idaho, Oregon and Washington.

—o—

William Klopman, Burlington Mills Corp., New York, has resigned as president and vice president of the corporation, but will continue to act in an advisory capacity with Burlington Mills Corp., and affiliates.

—o—

Frank E. Grody has been named Launderall parts manager of F. L. Jacobs Co., Detroit.

—o—

John C. Virden, chairman of John C. Virden Co., Cleveland, and **Martin P. Winther,** president of Dynamatic Corp., have been elected directors of Eaton Mfg. Co., Cleveland. Their election increases the number of directors of this company from 13 to 15.

—o—

W. F. Jessup has joined Cornish Wire Co., New York, as sales manager of the Cord Division. He was formerly chief of the wire mill branch of the Copper Division of the Civilian Production Administration.

—o—

E. F. Lazar has been appointed director of the Federal department, Sperry Gyroscope Co., Brooklyn, N. Y. **George Tate** has been named manager of export sales, and **A. R. Weckel,** director of commercial sales.

—o—

Robert C. Enos has been elected chairman of the board of the E. W. Bliss Co., Detroit, and **Franklin Berwin** has been elected a director to succeed **D. S. Harder,** who has resigned.

—o—

Milton La Riviere has been appointed regional manager of the St. Louis region, Electro-Motive Division, La Grange, Ill., General Motors Corp. He succeeds **G. E. Anderson,** who has retired after being in charge of electro-motive sales in the St. Louis region since 1925. Mr. La Riviere had been executive general agent of the Atlantic Coast Line, Washington, before joining Electro-Motive as district sales manager at Washington in 1944. **Robert E. Hunter** has been appointed district sales manager of the Chicago region for the division.

—o—

Howard A. Hein, formerly chief sales engineer, Cleveland Automatic Machine Co., Cleveland, has been appointed manager of the Detroit branch office. He has been associated with Cleveland Automatic since 1930.

—o—

R. D. Paine has been appointed manager of the Oakland, Calif., Lamp Works, General Electric Co. He succeeds **H. H. Barrows,** who has retired.

—o—

The American Society of Lubrication Engineers, at their annual spring meeting in Pittsburgh, has elected the following officers: **Oscar Maag,** Timken Roller Bearing Co., Canton, O., president; **W. F. Leonard,** consulting engineer, Chicago, secretary-treasurer; **Prof. D. D. Fuller,** head of Mechanical Engineering Department, Columbia University, New York, regional vice president; **R. G. Larson,** Shell Development Co., Emeryville, Calif., re-elected western vice president; **Norman C. Penfold,** Armour Research Foundation, Chicago, midwestern vice president. **E. M. Kipp,** Aluminum Co. of America, New Kensington, Pa., and **B. C. Voshell,** Socony Vacuum Oil Co., New York, were elected directors.

—o—

H. K. Clark, formerly executive vice president, Carborundum Co., Niagara Falls, N. Y., has been elected president of the company to succeed **Arthur Batts,** who has been elected chairman of the board. **Edwin R. Broden** has been elected

W. N. NOBLE
Appointed manager, Frit Division, Ferro Enamel Corp., Cleveland. Noted in STEEL, Mar. 24 issue, p. 71

LEE W. KINNEY
Appointed distribution manager, Liquid Carbonic Corp., Chicago. Noted in STEEL, Mar. 24 issue, p. 70

KEN O. HOOD
Appointed Pacific Coast district manager, Falk Corp., Milwaukee. Noted in STEEL, Mar. 24 issue, p. 71

GEORGE M. HUMPHREY

President, M. A. Hanna Co., Cleveland, and chairman, Pittsburgh Consolidation Coal Co., awarded the Charles F. Rand medal. Noted in Steel, Mar. 24 issue, p. 46

LeROY SALSICH

President, Oliver Iron Mining Co., Duluth, awarded the William Lawrence Saunders medal. Noted in STEEL, Mar. 24 issue, p. 46

WILLIAM A. JOHNSON

Head, Metallurgical Division, Clinton Laboratories, Oak Ridge, Tenn., presented the Rossiter W. Raymond award. Noted in STEEL, Mar. 24 issue, p. 46.

vice president in charge of operations, member of the board of directors and a member of the executive committee, of which Mr. Clark has been elected chairman.

William H. Wendel has been appointed administrative assistant to the president. **Harry C. Martin,** formerly assistant technical director, has been named technical director to succeed **Otis Hutchins,** retiring after 35 years' association with the company. **Donald G. Foot** has been named administrative assistant to the technical director, a newly created title. **Edward R. Newcomb** has been appointed director of sales engineering of the Coated Abrasive Division throughout the United States, and will have complete charge of field engineering plans, and **Boyd H. Work** has been appointed director of sales engineering for the United States and Canada for the Bonded Abrasive Division. He was formerly manager of the Sales Engineering Division which has been placed under the jurisdiction of the Sales Department. Both men will report to the vice president and general sales manager, **F. J. Tone Jr. S. S. Diemer,** has been promoted to manager of purchases, and **Richard Kimball,** assistant manager of purchasing. **William E. Blake** has been named purchasing agent.

In the Technical Division, **George J. Easter,** formerly director of research, has assumed added duties and responsibilities as manager of research and development. **Charles Wooddell** and **Garret VanNimwegen** have been named assistant managers. **Henry R. Power,** previously chief chemist, has been promoted to manager of laboratories, and **F. P. Ronca** and **Walter G. Lautz,** assistant managers. **Fred A. Upper** has been advanced to manager of manufacturing technical service. Reporting to him will be **Arthur H. Prey,** appointed assistant manager of manufacturing technical service. All of the above named personnel of the Technical Division will report to the newly appointed technical director, **Harry C. Martin.**

—o—

Arden R. Hacker has been appointed manager of mechanical goods design at the Hurlingham, Argentina, plant of the Goodyear Tire & Rubber Co. Since his release from the Army, where he served as a major in the field artillery, Mr. Hacker has been associated with Goodyear as a designer in the Mechanical Goods Division, Akron.

—o—

Ed. Clabuesch has been named field service representative for Twin Coach Co., Kent, O. He will operate out of the company's Service Division headquarters in Kent.

—o—

Jess Toth, secretary, Harry W. Dietert Co., Detroit, has been selected as the recipient of the "Key Man" award by the Detroit Junior Board of Commerce, in recognition of distinguished service connected with board activities.

OBITUARIES . . .

Harbour Mitchell, vice president, E. J. Lavino & Co., Philadelphia, died suddenly after a brief illness, Mar. 23, at his home in Ardmore, Pa. He was president of Compania Cubana de Minas Y Minerales, S. A., Havana, Cuba, and vice president of Lavino Shipping Co., Philadelphia.

—o—

William F. Torkington, 61, superintendent, Caldwell Mfg. Co., Rochester, N. Y., died Mar. 21. He had been associated with the company for 37 years.

—o—

Homer A. Lacey, 61, assistant superintendent of the mills department, Tennessee Coal, Iron & Railroad Co., Birmingham, died Mar. 21. He had been associated with T.C.I. since 1906.

—o—

Lewis E. Megowen, 55, representative for the Marathon Foundry & Machine Co., Wausau, Wis., died Mar. 22.

—o—

Walter D. Pheteplace, 73, former president and general manager, Pfaudler Co., Rochester, N. Y., died Mar. 22. He had headed the company until his retirement two years ago.

—o—

William D. B. Motter Jr., mining engineer and assistant to the vice president, Chile Exploration Co., New York, died Mar. 18.

—o—

George W. Roberts, 72, who retired as chairman, Athey Truss Wheel Co., Chicago, now the Athey Products Corp., died Mar. 20 in St. Petersburg, Fla.

—o—

Howard S. Hamilton, 60, Charles I. Wesley Steel Treating Co., Milwaukee, died Mar. 22. He retired from the steel company in January of this year.

—o—

David Lennox Sr., 90, inventor, and long associated with the Marshalltown Trowel Co., Marshalltown, Ia., died recently in that city.

—o—

Hammond V. Hayes, 86, electrical engineer and former president of the Submarine Signal Corp., Boston, died recently.

—o—

J. J. Wilson, 59, Seattle branch manager, John A. Roebling's Sons Co., died Mar. 6.

PRODUCTION of special formula cast steel drum gears at the Portland, Oreg., plant of Hyster Co., is based on thoroughly efficient machining practice developed by the company's machine shop personnel. An essential component in most power applications of Hyster's materials handling equipment, the gear, Fig. 6, has 54 teeth; diametrical pitch, 2½/3; profile stub, 20 degrees; addendum, 0.333; standard depth, 0.749; excess depth, 0.010; chordal addendum, 0.3375; chordal thickness net, 0.6282; cut, 0.6222—0.6202; minimum brinell—200.

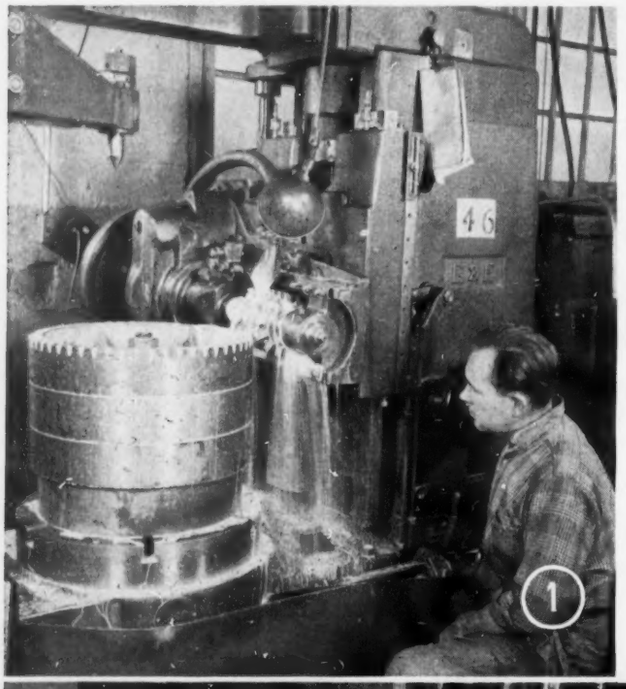
Two truckloads of 75 rough castings each are received from an outside foundry every day. Each truck is unloaded by Karry Krane, as in Fig. 3, in 22 min, transferred to pallet and storage awaiting delivery to machine shop. All this movement after unloading is by Hyster lift-trucks, with the machine shop furnishing a print and work order control.

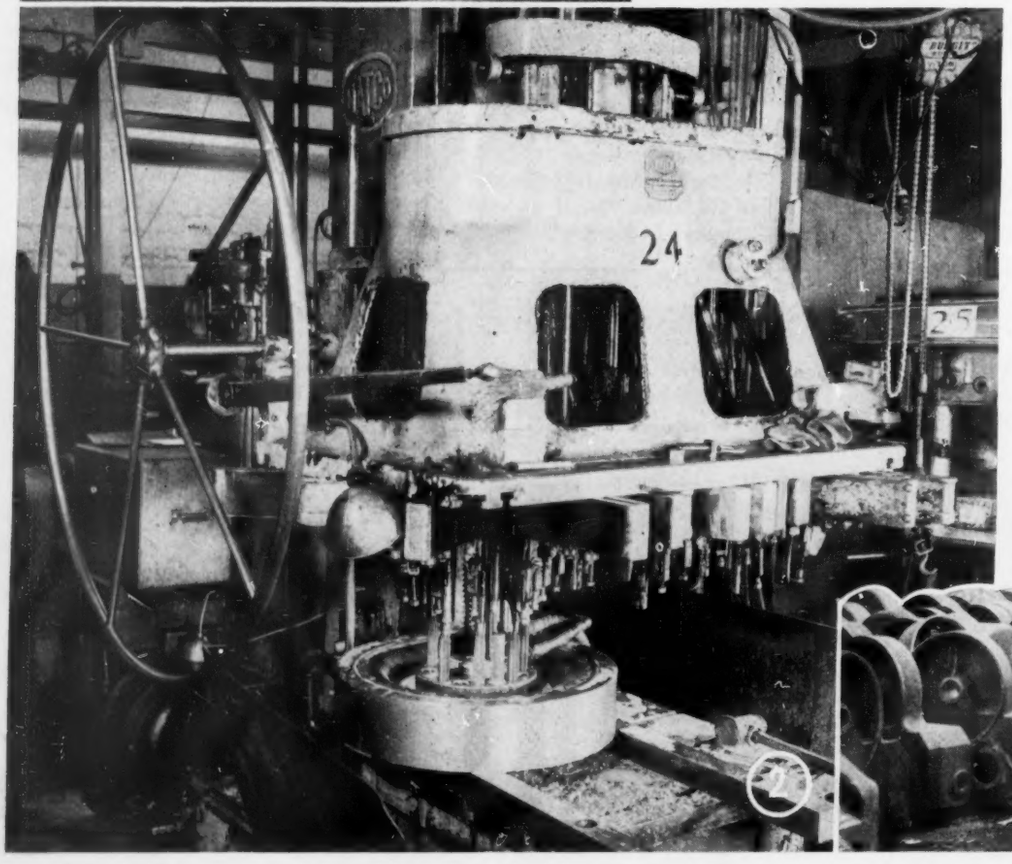
Palleted drums are stacked in storage from 10 to 12 ft high, making possible uncommonly large inventory in small square footage of space. Movement from truck to storage is 300 ft max; from storage to machine side is 100 ft max. Handling costs per piece, moved and stored in this manner average 12.825 cents.

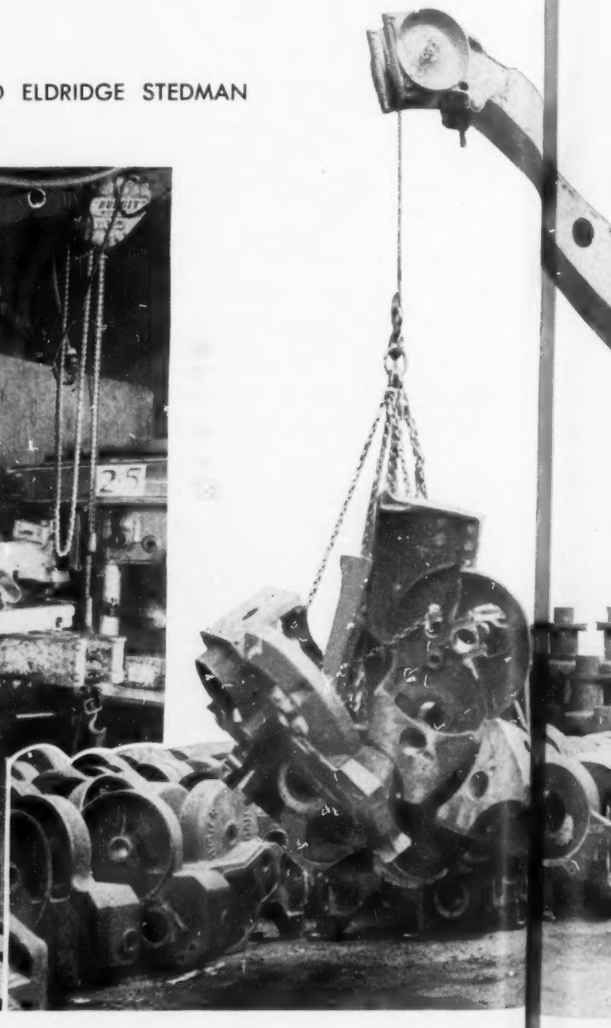
First machining is on a 36-in. Bullard, involving eight operations. A square turret is used on three of these operations and a 5-face turret on five of the operations. The setup uses a 3-jaw chuck with three jacks set 2½-in. high and 1-in. from the edge. The tool setup on each of the turrets is diagrammed herewith. For step procedure of operations see Fig. 5.

All tools used on both turrets are carbide-tipped. The shop experimented with negative rake of about 5 degrees, but found this to be of scant advantage on drum machining. The third square turret operation is that of the finish turning the outside diameter with feed of 0.245-in. per revolution, which is a feed not generally recommended for carbide cutters. Neverthe- (*Please turn to Page* 105)

By GERALD ELDRIDGE STEDMAN

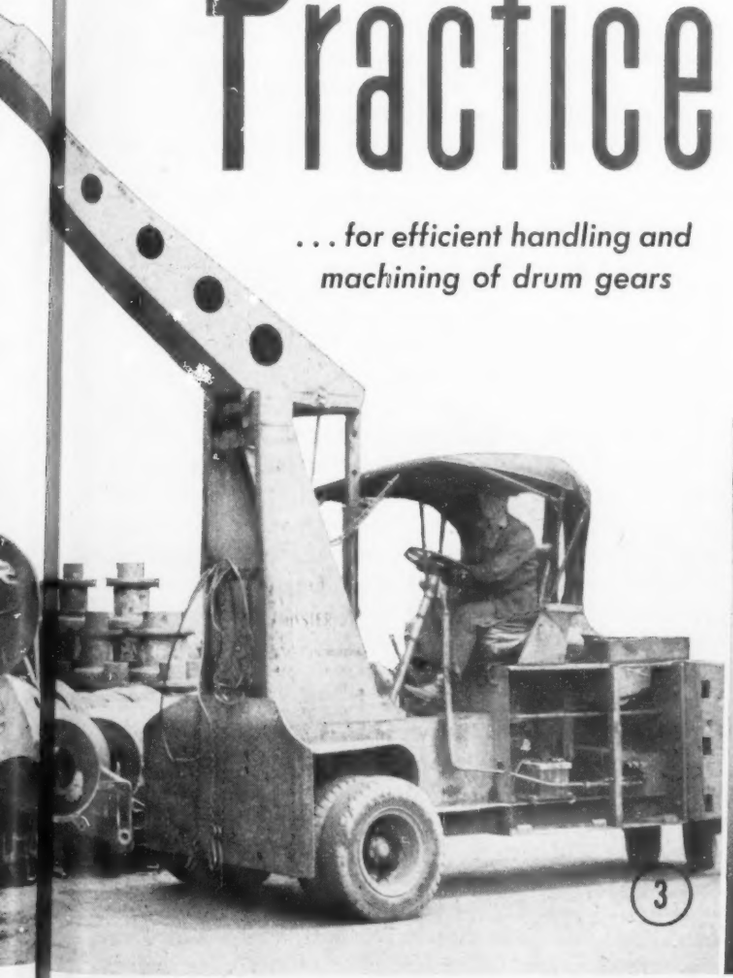






Shop Practice

. . . for efficient handling and machining of drum gears



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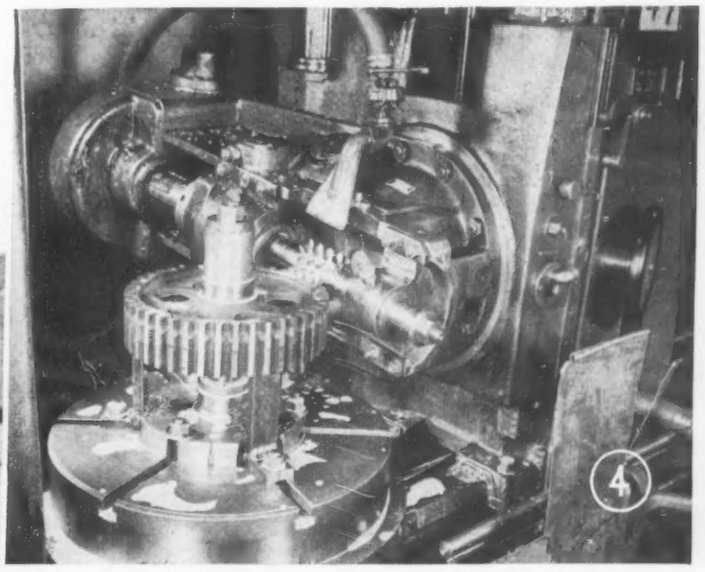

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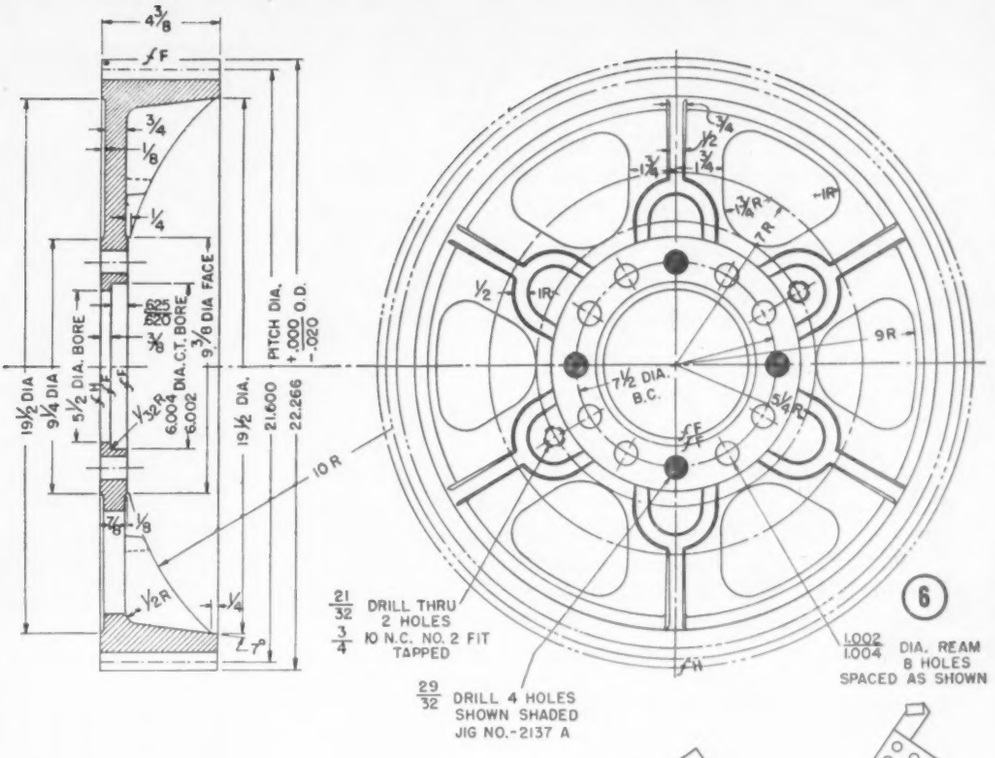
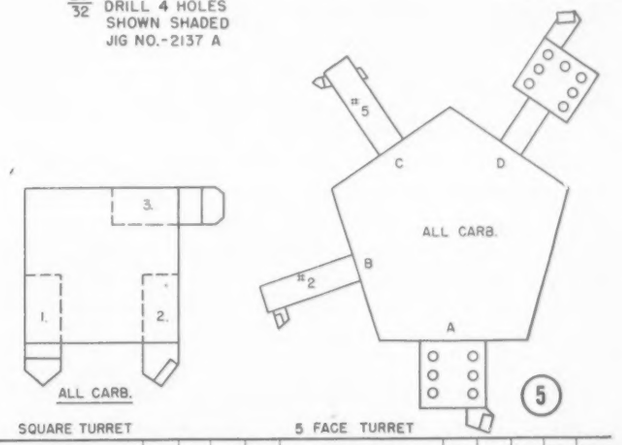
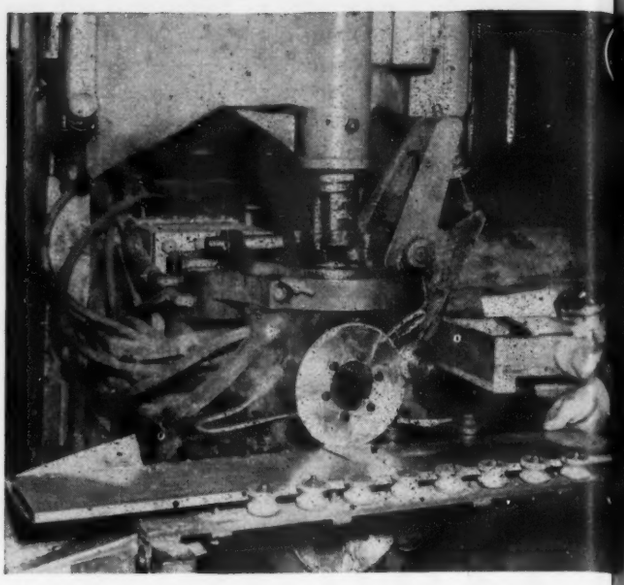




	SQUARE TURRET					5 FACE TURRET					
STEP	OPERATION	TOOL	CLIP	RPM	FEED	OPERATION	TOOL	CLIP	CLIP	RPM	FEED
1	ROUGH FACE RIM	1	1	37	033	ROUGH FACE HUB	A	1	∽	37	.018
2	ROUGH TURN O.D.	2	2	37	033	BORE 5.500 DIA-1 CUT	B	1	∽	37	.018
3	FINISH TURN O.D.	3	3	58	245						
4						ROUGH C' BORE	B	2	2	84	.018
5						FINISH C' BORE	C	3	3	84	.018
6						FINISH FACE HUB & RIM	D	4 AND 5		84 47	.018 .033

Surface characteristics of aluminum combined with mechanical properties of steel by continuous hot-dip process. New heat and corrosion-resistant material expected to provide designers and engineers more flexibility in fabrication of diversified products



ALUMINUM C

SUCCESSFUL development and production of aluminum coated sheet steel affords designers and engineers with a new material with many desirable properties for fabrication into a variety of diversified products. Aluminum coated steel combines the surface characteristics of aluminum with the mechanical and physical properties of steel. It provides the special advantages of good corrosion resistance and heat reflectivity with an attractive appearance; the core contributes to tensile and yield strength, endurance and working qualities of steel; and the combination of steel and aluminum produces a material of excellent heat resistance.

Sheet steel is coated with aluminum by a continuous hot-dip process developed by American Rolling Mill Co., and the product, which has a soft, satiny appearance somewhat similar to a sheet of aluminum, is offered under the trade name Aluminized steel. For regular use a dull finish is recommended by Armco. Where a brighter appearance and greater reflectivity are required an "extra smooth" grade is available.

The weight of aluminum applied to both sides of the sheet is approximately 0.50 oz per sq ft, resulting in a coating thickness of about 0.001-in. of aluminum per side. This thickness of coating is much greater than terne plate or tin plate coatings. As a comparison, the aluminum coating is about as thick as the standard galvanized coating, yet about two and one-half times as much zinc, by weight, must be applied to obtain this thickness. A terne coating of the same thickness would require close to four times as much metal thickness, while tin plate would need more than two and one-half times the coating weight to provide the same coating thickness. Tin and terne coatings of this thickness are not produced commercially. The weight of aluminum applied by Armco is approximately the same for all gages of steel coated.

The corrosion resistance of aluminum coated steel, in 20 per cent salt spray at 95° F, is very good, exhibiting a coating life of 800 to 1000 hours.

Aluminum coated steel will withstand temperatures up to approximately 900° F without discoloration, and up to about 1600° F without destructive scaling. The lack of discoloration at elevated temperatures keeps the reflectance of heat and light at a high value. On exposure to temperatures above 900° F, the aluminum coating begins to alloy with the iron of the base metal, forming a tight gray surface alloy of iron-aluminum. This alloy is well known as a refractory material and short time tests indicate it resists destructive scaling to approximately 1600° F. When exposed to temperatures of about 2000° F the alloy disintegrates into a whitish, oxidized scale and fails.

Once formed by exposure to temperatures above 1200° F the refractory iron-aluminum alloy remains inert. Cooling will not bring the coating back to its original state. However, a protection against high temperatures is established by the conversion of the coating from aluminum to the iron-aluminum alloy. The iron-aluminum alloy coating is effective and long-lived when subjected to repeated heating and subsequent cooling.

In a series of cyclic tests carried out in American Rolling Mill Co. laboratories, specimens of Aluminized steel were alternately heated to a designated temperature, held at that temperature for 30 min, permitted to cool for 10 min, then reheated, the cycle being repeated 20 times. Temperatures of 1200, 1400, 1600, 1800, and 2000° F were used. The 1600° F specimens showed but little deterioration and those exposed at lower temperatures showed no evidence of destructive oxidation.

Superior heat resistant properties of aluminum coated steel accounts for its successful performance when used as a material for mufflers, heat exchanger tubes, and combustion chambers of gas-fired warm air heating furnaces. In these uses the coated steel must possess both heat and corrosion resistance, that is, it must resist destructive scaling at elevated temperatures and the corrosive effects of the products of combustion and their condensates.

Heat Reflectivity: Radiant heat generally is transferred primarily by infrared rays, which are invisible to the human eye. Heat reflectance is concerned with the turning back of the infrared rays emitted by a source of heat. Some materials have the tendency to absorb most of the infrared rays impinging on them. Others have the property of reflecting most of these rays. The combination of heat resistance and good heat and light reflectivity are of importance in such applications as heat deflectors for electric ranges, oven liners for kitchen ranges, oven linings

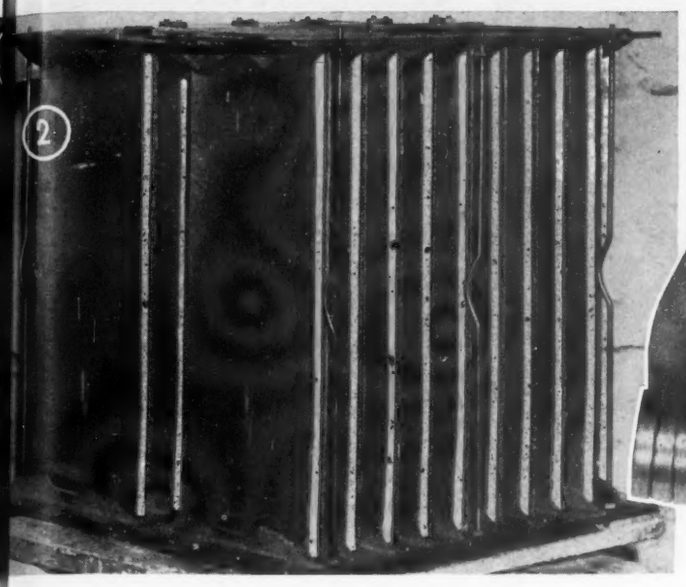
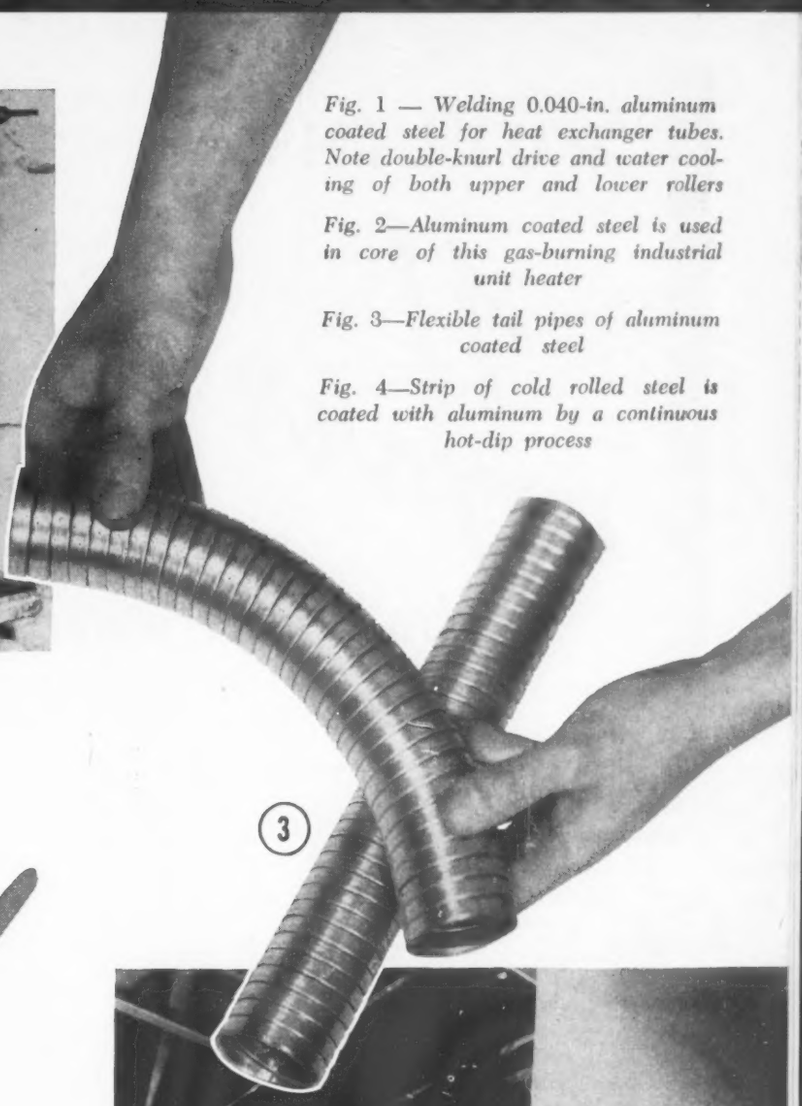


Fig. 1 — Welding 0.040-in. aluminum coated steel for heat exchanger tubes. Note double-knurl drive and water cooling of both upper and lower rollers

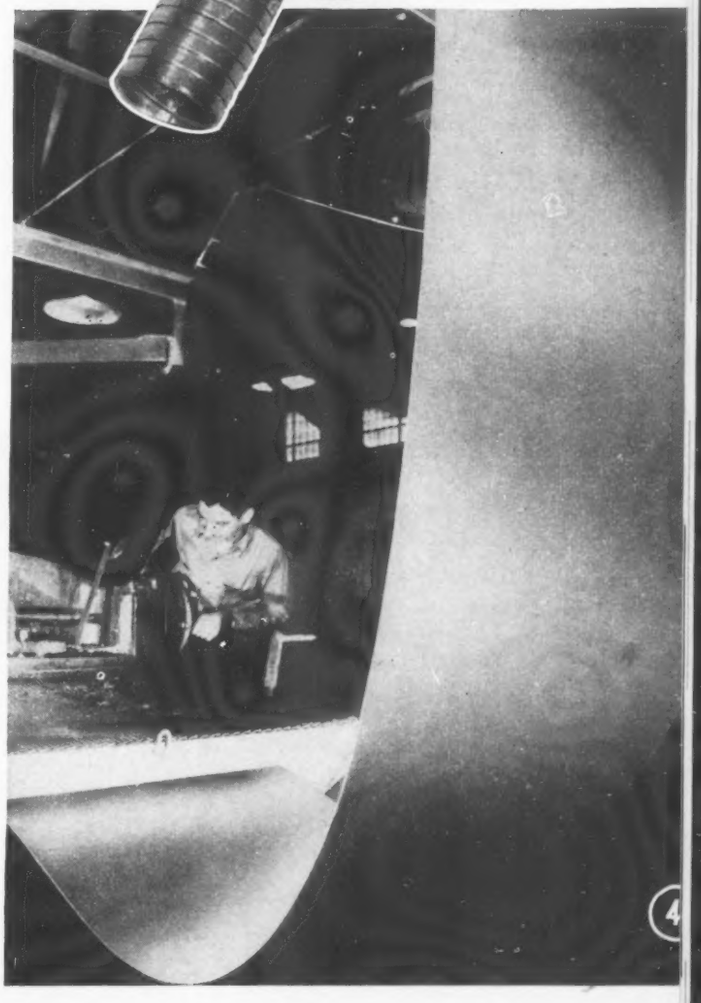
Fig. 2—Aluminum coated steel is used in core of this gas-burning industrial unit heater

Fig. 3—Flexible tail pipes of aluminum coated steel

Fig. 4—Strip of cold rolled steel is coated with aluminum by a continuous hot-dip process



COATED Steel



and main bodies of coal and wood-fired ranges. Heat reflectance increases thermal efficiency. The resistance of aluminum coated steel to heat discoloration helps maintain the advantages of light reflectance, thereby increasing visibility in the oven interior.

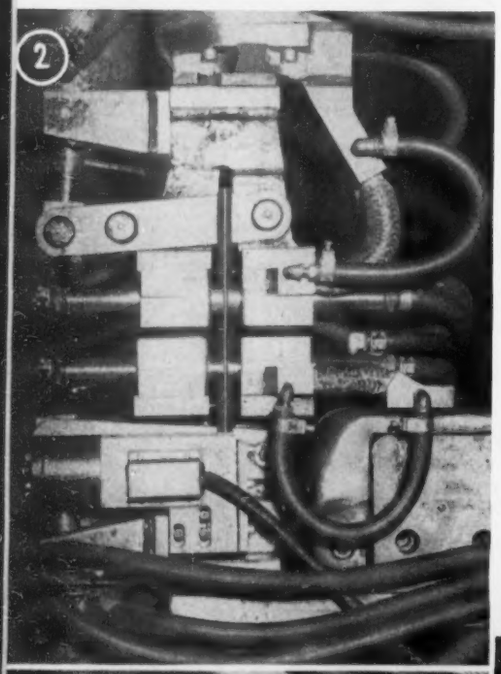
The mechanical properties of aluminum coated steel are determined to a large extent by the type of steel base used. This base is supplied in low carbon or copper-bearing steels, with all the steel bases having the same standard aluminum coating. The mechanical properties of the base metal supplied is given below:

Property	Low Carbon and Copper-Bearing Steel Base
Yield strength	30,000 psi. min
Ultimate tensile strength	45,000 psi. min
Per cent elongation in 2 in.	15-25
Modulus of elasticity	29,000,000 psi.
Rockwell B hardness	B-70 maximum

Aluminum hot-dip coated sheet is available in thicknesses from 0.0889-in. to 0.0296-in. (No. 14 through No. 23 gage), to 38½-in. widths; and in 0.0295 to 0.0179-in. (No. 24 through No. 28 gage) and 0.089 to 0.135-in. (No. 11 through No. 13 gage) thicknesses to 36 in. widths. Also available is a lighter sheet of from 0.0178 to 0.0148-in. (No. 29 and No. 30 gage) in widths to 30 in. In view of the fact that aluminum coated sheet is lighter than the corresponding gage of solid steel (solid aluminum has only about 35 per cent of the density of steel) steel gage weight (*Please turn to Page* 102)

PULLING *Harrow* TEETH

. . . with a Spot Welder



MOST people familiar with resistance welding and the equipment used in this method of joining metal to metal rightly think of it as a means of assembly. Yet spot welding machines are being employed with reverse effect at Kewanee Machinery & Conveyor Co., Kewanee, Ill., to pull apart rail steel bars in the manufacture of harrow teeth. This unconventional method of processing pointed bars has proved to be very economical, resulting in savings exceeding 50 per cent.

Previously, in manufacturing harrows, it had been necessary to use forged bars produced by one of several standard techniques available, the most common embracing blacksmithing and the power hammer. Manual skill was required and results were not always uniform.

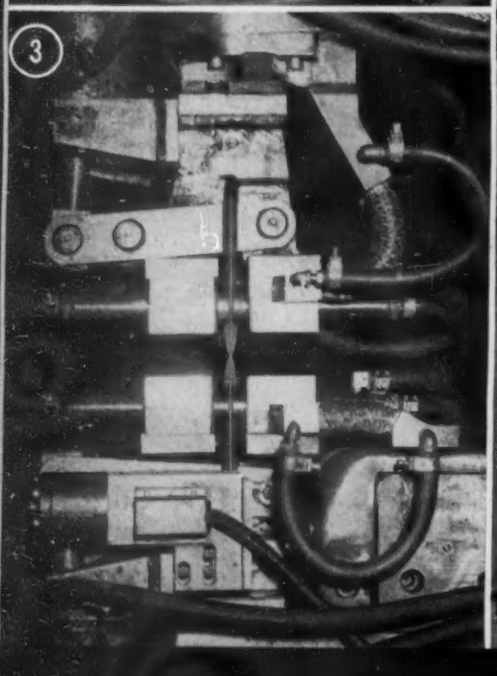
After the problem had been studied by welding engineers of Sciaky Brothers Inc., Chicago, it was decided the job could be done by resistance welding—simply by having a high amperage current flow through the bar and by pulling it apart at the proper moment so that it will stretch and break into two perfect points, as shown in right half of Fig. 1.

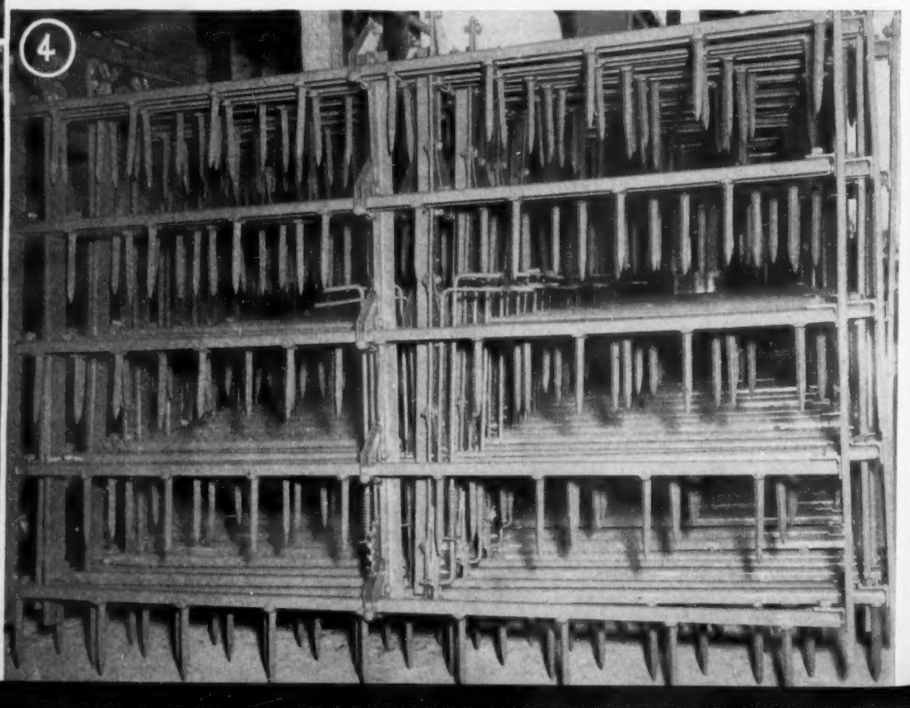
The Sciaky 2T9 "three phase" welder was equipped with two special hydraulic clamping devices, cylinders and flexible cables (Figs. 2 and 3), and instead of using the cylinders for obtaining pressure at the tips, the operation was reversed. The tapered tooth profile was determined within a few thousandths during experiments on the pulling operation by setting the value of secondary current, the time and the pulling force. Secondary current was interrupted just prior to the breaking of the bar to avoid arcing between the ends, which would ruin the points of the bars.

In production at Kewanee, reclaimed rail steel with high carbon content is used. Time required for one pulling operation is 8 sec, including handling time. A rate of 750 points (375 operations) per 50-min hour has been attained. After pulling, teeth are quenched in an oil emulsion which, together with the quench and annealing sequences incorporated in the welder, eliminate brittleness which would cause points to break should the completed harrow, Fig. 4, strike rocks while in operation.

The machine used is entirely self-contained, fully automatic and is designed for heavy duty production work. When equipped with proper clamps, it is capable of pulling round, square or diamond shaped bars—capacity in round bars is from minimum diameter of ¼-in. to a maximum of ¾-in. Its pulling force can be set up to 4000 lb, using 80 psi line pressure.

This Sciaky machine, rated 135 kva at





67 per cent duty cycle for welding, is designed to operate on reduced current per line only one-sixth that required for operating other types of resistance welding units.

Power demand is 50 per cent less and operation is at near unity power factor. It can easily be converted to a spot welder by removing dies and replacing them with horn, electrode holders and tips. Throat depth is 24 in., and electrode stroke 4 in. (3-in. retraction and 1-in. working stroke). In welding, the same machine is able to attain a welding speed of 90 spot welds per minute on two $\frac{1}{16}$-in. thicknesses of pickled mild steel and 6 welds per minute on two 5/16-in. thicknesses of the same material.

Flux Produces Strong Brazes Without Metal Detriment

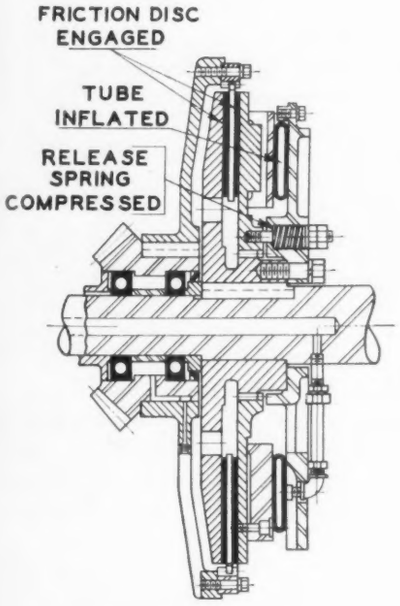
A control flux developed recently by the Navy Bureau of Aeronautics, makes possible production of consistently strong silver brazes without detriment to the metal or danger to the brazing operator, according to the Office of Technical Services, Washington.

Composition of the control flux consists of 50 per cent potassium tetraborate, 30 per cent potassium acid fluoride, 15 per cent potassium fluoborate and 5 per cent boric acid. It is believed to satisfy all requisites for a standard flux for silver brazing alloys flowing at temperatures up to 1300° F and, with some limitation in flux film persistence, up to 1400° F, the report states.

The OTS report designated as PB-40296, is entitled "Control Flux Composition for Silver Brazing—Navy Specification 51F4".

—o—

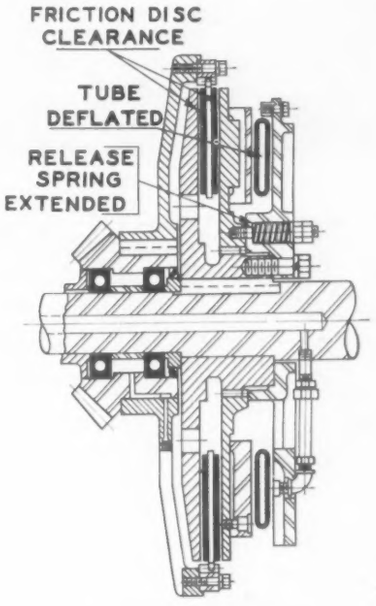
Comprehensive presentation of the best drafting practice now employed in the aircraft industry is contained in the Aeronautical drafting manual published by Society of Automotive Engineers Inc., New York. Abbreviations, dimensioning, lettering gears, threads and other standard subjects are included, along with sections on forgings, finishes, splines, charts and springs.



CLUTCH ENGAGED

SMOOTH LOAD ACTION

. . . for power shovels provided by air-operated disk-type clutch



CLUTCH DISENGAGED

IN designing power shovels certain problems are encountered which were not present in the older type of steam shovel. In the steam shovel design, especially of the revolving type, separate engines were used for each of the motions of hoisting, crowding and swinging.

To attain these motions on the gasoline or diesel-powered shovel it was not practical to use separate engines, making it necessary to pick up loads by means of friction clutches. With the steam-powered machines the engines started under load and gradually came up to speed, whereas the power shovel had to pick up the load while the clutch shaft was turning at full speed.

In the late 1930's various engineers turned to power-operated clutches, using vacuum, hydraulic and pneumatic controls. As these proved themselves, the trend toward power - operated clutches continued. Recognizing this trend, Osgood Co., Marion, O., developed air controls which were first applied to the swinging and hoisting clutches, and subsequently expanded until all Osgood excavators of 1 yd and larger capacities are now provided with air controls for all operations except the main engine clutch.

In order to overcome jerking the machine when engaging the swinging clutches, the company developed a new clutch to give smooth action yet engage quickly enough to prevent undue heating and wear. The clutch is disk type, engaged by admitting air to a circular rubber tube or doughnut. This tube is confined between two plates, one of which is movable. When air is admitted under pressure the tube expands and causes the floating plate to clamp the friction disk between the floating plate and the back plate of the clutch, as shown in the accompanying drawings.

By means of metering valves the pressure can be varied at the will of the operator and the load picked up as slowly or as quickly as the operator desires. Yet because of the volume of air required it is impossible for the operator to admit air fast enough to cause the machine to jerk.

According to Osgood engineers simple construction of this type clutch eliminates wear with the consequent lost motion which develops. There are no adjustments required as wear of the disk is automatically taken care of by the expansion of the tube.

LATEST

Hypoid

Fig. 1—Low speed high torque test equipment

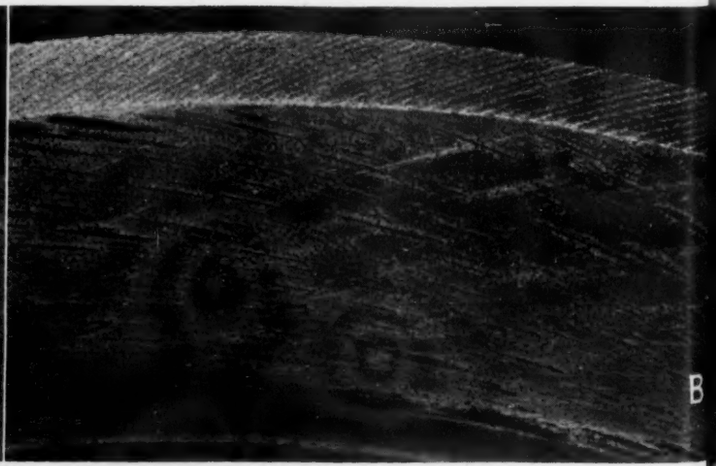
Fig. 2 — Chart showing composition and characteristics of four types of modern hypoid lubricants

Fig. 3 — Enlarged photographs of pinion tooth surfaces from low speed high torque test on commercial hypoid lubricants of following types: (a) Sulphur-chlorine-phosphorus type; (b) sulphur-phosphorus type; (c) chlorine-sulphur type; (d) chlorine-sulphur-lead type

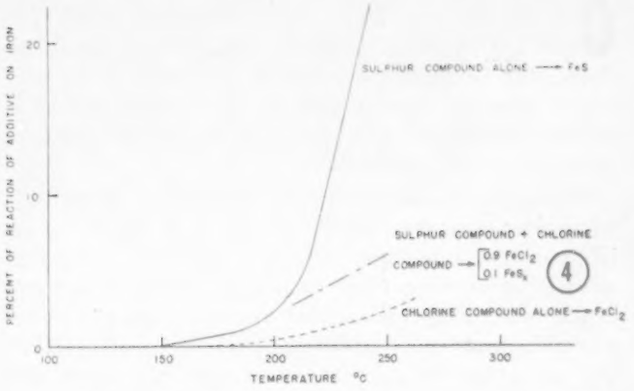
Fig. 4—Graph showing reactivity of sulphur and of chlorine containing additives on iron powder

MODERN HYPOID LUBRICANTS

TYPES		LEAD SOAP SULPHUR, CHLORINE	SULPHUR PHOSPHORUS	CHLORINE, SULPHUR	SULPHUR, CHLORINE PHOSPHORUS
COMPOSITION	% Pb	0.78	0.00	0.00	0.00
	% S	2.8	1.5	0.8	1.2
	% Cl	1.0	0.00	3.2	0.4
	% P	0.00	0.04	0.00	0.04
AVAILABLE FORM		BLEND	BLEND	CONCENTRATE	CONCENTRATE
HIGH SPEED AXLE TEST		PASS	PASS	PASS	PASS
LOW SPEED HIGH TORQUE AXLE TEST		PASS	PASS	FAIL	PASS
SPICER TEST		18	20	14	18
FILM STRENGTH SAE AT 1000		ERRATIC	70	320	250
TIMKEN OK LOAD		69	51	33	33



Lubricants



REACTIVITY OF SULPHUR AND OF CHLORINE CONTAINING ADDITIVES ON IRON POWDER

. . . support increased axle loads. Fundamental principles involved in the new developments are discussed here by Dr. C. F. Prutton of Case School of Applied Science, Cleveland

IN the early days of automotive development, speeds and power outputs were so low that rear axle lubrication was of secondary importance. Mineral oil blends with low load carrying capacity were adequate.

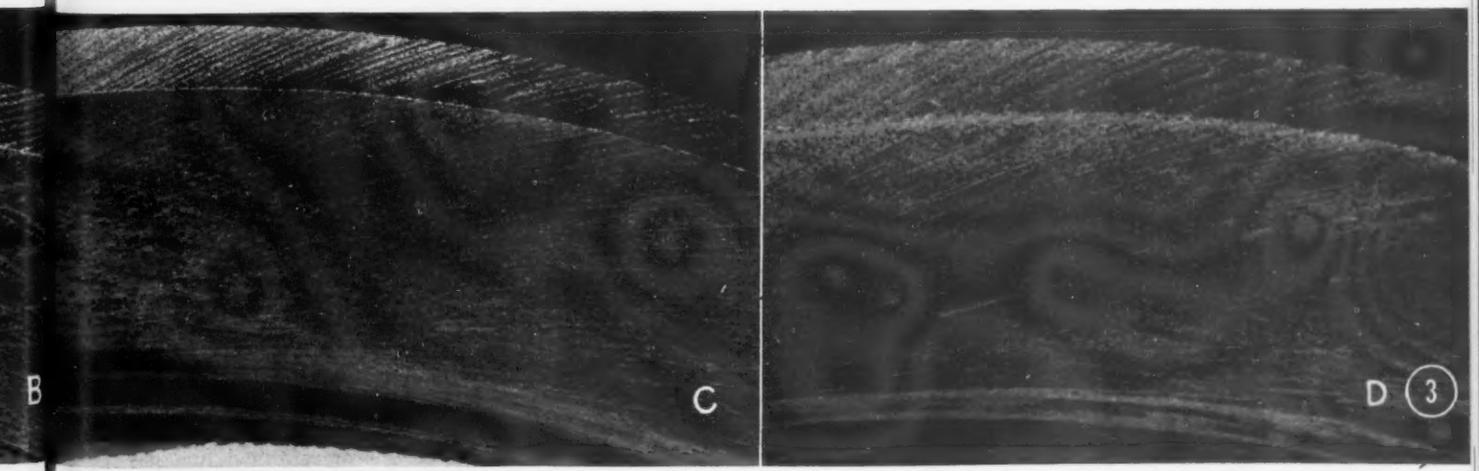
After the first World War, increasing speeds and power were built into cars, roads were greatly improved, and it became necessary to build automobiles which could be driven safely at high speeds. Wheels were reduced in diameter, center of gravity lowered and, eventually, through the adoption of the hypoid axle in 1932, the rear axle gears and housing were reduced in size together with a lowering of the drive shaft to the rear axle.[1] However, lubrication of hypoid axles required the development of new lubricants of load carrying capacities many times greater than that of the standard rear axle lubricants formerly employed.

Several years before the hypoid axle was adopted, a gear lubricant of lead soap and sulphur in mineral oil had been used for overloaded spiral bevel gears with success. It was therefore to be expected that the lead soap-sulphur type of hypoid lubricant was employed for the first production hypoids. This lubricant performed well in passenger car axles but was not satisfactory in heavily loaded truck axles, so in 1936 the sulphur-chlorine[2] type of hypoid lubricant became widely adopted and known as an all-purpose lubricant since it performed in both passenger and truck axles. Other lubricant types which developed limited usage were a lead soap, sulphur, chlorine type and another containing phosporus and sulphur as active elements. Fig. 2 shows composition and characteristics of these types of lubricants.

For the last 10 years the sulphur-chlorine type has made an enviable service record. During the recent war, this type was employed to lubricate practically all military axles for all of the Allies and Lend-Lease. Recently, new hypoid lubricant requirements have been set which call for improved antistaining properties and better performance on the high torque low speed gear test, equipment for which is shown in Fig. 1. These changes have been met by the incorporation of phosphorus compounds into the chlorine-sulphur type to produce a product of excellent all-round performance. A comparison of different types of hypoid lubricants is made in Fig. 2. Photographs of pinion tooth surfaces after a low speed high torque test on commercial hypoid lubricants are shown in Fig. 3, A-D.

Principal among the specification requirements on hypoid lubricants are the full-scale axle tests, one a suddenly applied shock loading at high speeds[3] and the other a 30-hour uniform high torque low speed test.[4]

After repeated application of the shock loading test to gears, analysis of the surface of gear teeth and the insolubles in the gear oil show that ferrous chloride is formed in minute quantities on the contact surfaces. It is this ferrous chloride formed by (*Please turn to Page* 106)



Technical Highlights ...of the Western

CONTINUED rapid industrial expansion of the Pacific Coast area found ample reflection last week in the successful Western Metal Congress and Exposition held in the two Oakland Civic Auditoriums and sponsored by the American Society for Metals.

When the exposition closed Thursday night after a 6-day run, more than 40,000 persons had visited the exhibits of 175 exhibitors. Nearly a third of the exhibits were those of West Coast companies, which is not surprising when it is realized that the area came out of the war with considerable additional capacity for the production of primary metals, including steel, aluminum and magnesium, plus components such as forgings, castings and stampings. Metalworking industry employment in the San Francisco bay area increased 85 per cent in the past 6 years while the population gained 46 per cent, declared Carl J. Eastman of the San Francisco Chamber of Commerce. Lee Delhi, national American Welding Society president, predicted that although bay area plant capacity had doubled since 1939, it would redouble in a few years. Many additional fabrication and assembly plants have been projected since the close of the war to supply the local markets with goods and care for potential business in the Far East.

The American Society for Metals, the American Welding Society and the American Foundrymen's Association each presented a 4-day technical program covering many phases of steel and nonferrous metal production and processing. These were the highlights of some of the 75 papers and lectures presented by outstanding men:

Narrower Hardness Bands Needed: A. L. Boegehold, head, metallurgical department, Research Laboratories Division, General Motors Corp., Detroit, in presenting the Golden Gate lecture before ASM, said that reasonably accurate predictions of hardness in various steel sections can be made from hardenability curves. However, hardness is affected by varying the velocity of the quenching medium.

Variation in cross sectional hardness of quenched sections influences the hardness variation obtained from tempering such sections, he said. This variation in tempered hardness must be restricted in certain components to the extent that narrower hardenability bands are needed than those now available. Components include torsion bar springs, automobile rear axle shafts, rear axle ring gears and pinions and other carburized parts such as ball and roller bearing races. Better control of hardenability in the steelmaking process is needed, he said.

Full Hardening Unnecessary: Walter E. Jominy, staff engineer, Chrysler Corp., Detroit, pointed out that it is generally conceded that it is unnecessary to harden steel to the center of the part unless the part is subject mainly to tensile stresses. Such a part might be a bolt. For the majority of parts which require alloy steel, bending and torsional stresses are far greater than pure tensile stresses and these bending stresses, of course, are maximum at the surface and zero at the center. Such is the case for axle shafts, gears, pinions and the like. It is felt, he said, that no exact rule may be given for depth of hardening for such parts but in general hardening half way from the center to the surface is sufficient.

Use of hardenability data in the shop and in the specification of steel for new parts is a great help to the metallurgist. By using Boegehold's method for determining the cooling rate at various places in a part it is possible to predict with accuracy whether heats of steel will harden properly in production operations at the time these heats are received before fabrication into parts.

New Heat Treating Approaches: G. C. Riegel, chief metallurgist, Caterpillar Tractor Co., Peoria, Ill., said his company is using isothermal (cycle) annealing equipment capable of handling over 2,000,000 lb of alloy forgings per month and providing optimum exterior, microstructure and hardness resulting in lowest metal removal cost.

Another machine at Caterpillar, using induction heat, hardens, shrinks to assemble and tempers track rollers in a single operation. Mr. Riegel also described induction heating equipment for continuously hardening and tempering mill length steel bars (see STEEL, July 3, 1944, p. 84).

Controlled Atmospheres: Generators for preparation of controlled atmospheres for heat treating furnaces can be classified into two broad groups, endothermic and exothermic, H. M. Heyn, manager, heat treating department, Surface Combustion Co., Toledo, O., said.

The exothermic type makes atmospheres from fuel gas that burns with a percentage of its complement of air. Its combustion generates enough heat to support reaction. The lean combusted gas has application in the nonferrous field, he said. When applied for bright annealing copper, the CO content should not exceed 1.5 per cent and the CO_2 content should be about 10.5 per cent. The rich combusted gas, which would contain about 10.5 per cent CO and only 5.0 per cent CO_2 has application for the bright annealing of steel up to 0.20 per cent carbon and for the clean hardening of medium carbon steel up to 0.40 carbon, provided the exposure of the metal to this gas is of short duration, say up to 30 min.

Endothermic generators, where heat is required to reform the air and fuel gas mixture have wider application. These are of two types, one using charcoal and the other natural gas, propane or butane. The charcoal type, making an atmosphere with 34 per cent CO, less than 2 per cent hydrogen and balance nitrogen, has restricted application. It is splendid, however, for carburizing or hardening without decarburization of the high carbon steels and annealing of high carbon steels.

For that reason, the reacted gas or reformed fuel gas

Wide range of subjects on steelmaking, casting, joining, heat treating, surface finishing, inspection and testing of ferrous and nonferrous materials discussed at meetings sponsored by American Society for Metals at Oakland, Calif.

Metal Congress

and air, resulting in an atmosphere of 20 per cent CO, 40 per cent hydrogen, trace of methane and balance nitrogen, has wider and more practical application. Tests in the laboratory and field have proved that the CO and CO_2 ratio and the H_2 and H_2O ratio are reflected in the dew point of the gas. By controlling these ratios, a gas can be prepared which will be in carbon balance with the steel being heat treated. Wide range of applications includes clean and bright hardening and annealing of medium and high carbon steels, gas carburizing and dry cyaniding and carbon restoration, he said.

Heat Treating Tools: Cutting tools will not give maximum production unless properly hardened, said A. H. d'Arcambel, vice president, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn. There are several ways in which this result may be accomplished with heating and tempering in commonly used types of furnaces, including salt bath, if properly controlled. Tool life also may be extended through such surface treatments as nitriding, steam oxidizing and chromium plating. Subzero treatments may be applied to highly alloyed steels.

Selecting Tool Steels: "The truth is that we have, as yet, in tool and tool steel practices devised no safe means of being sure of the superiority of one type over another, except by actual service and production tests," declared Norman Stotz, president, Braeburn Alloy Steel Co., Braeburn, Pa. "Our ingenuity and experiences serve us in good stead as a guide, but they are not yet reduced to either laws or formulae."

Hardness at room temperature and "hot" hardness are both extremely important to any one tool but they are not necessarily related, he said. High hardness at room temperature does not mean high "hot" hardness at the working tip, nor does a low "cold" hardness mean a low "hot" hardness. True meaning of "hot" hardness has not been resolved into an exact science.

He said that the measured hot hardnesses of the molybdenum type of high speed steels are generally lower than the equivalent grades of the tungsten family. "And yet," Mr. Stotz said, "we can safely say that during the height of the war production no tools made of the properly selected and properly heat treated molybdenum high speed steel failed to hold their own with their equivalent steels in the tungsten family, and in many cases they did better."

Handling Tool Steels: W. H. Wills, metallurgist engineer on tool steels, Allegheny-Ludlum Steel Corp., Dunkirk, N. Y., said that users of tool steels may be divided into two general groups—tool manufacturers for whom steel is their raw material, and industrial users who require it for production. The latter are greatly in the majority.

Carbon tool steel still is much used, but alloys such as manganese, chromium, vanadium, tungsten and molybdenum play an all important part in modern tool steel picture, since they influence hardenability, wear resistance, hot hardness and other properties essential to best performance. Closer attention should be given to heat treatment, he said. Industrial users, especially are often lax and get by with inferior equipment but this is a short-sighted policy in view of the high cost of labor and materials. Another factor to watch is the intelligent handling of tool steel in the stock and tool room, which can pay good dividends in avoiding mixup of grades and various kinds of tool failures.

Chemistry of Steelmaking: In practical steelmaking, said John Chipman, head, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., it must be emphasized that the slag formed in the melting of steel is not a mere by-product of the process but an essential factor in its control. Chief function of open-hearth slag is to provide a controlled flow of oxygen into the molten metal for removal of principal impurities.

Until recent years, all of the information on the chemical behavior of molten steels was obtained the hard way—namely by observation of commercial steelmaking operations. Development of high frequency induction furnaces has made it possible to study molten steels in the laboratory since small samples may be held at 2800-3200° F. An additional aid has been the development of improved refractories which will not react with the metals, plus use of the high vacuum technique. Methods for cooling samples to room temperatures without changing their composition still await perfection.

Steelmaking Practice: Changing demands as to type of product and the remarkable developments in fabrication and treatment have had a profound effect on the types of steel required, and the metallurgy of the various processes by which steel is produced, said C. H. Herty Jr., assistant to vice president, Bethlehem Steel Co., Bethlehem, Pa. For example, electric furnace steel production has increased from 600,000 tons annually to 3,000,000 tons in the past quarter century.

Research in Carbon Steel: Dr. Harold K. Work, director of research, Jones & Laughlin Steel Corp., Pittsburgh, told how his company contributed to the development of better steel products through the use of pilot or semi-plant scale process equipment. This equipment includes a 4-ton open hearth and a (*Please turn to Page* 96)

Increases Steel Output by

Oxygen Impingement Technique

Increasing temperature of the open-hearth bath by the use of oxygen as a reagent reduces time of heats from 12 to between 6 and 7 hours. Gas blown at high velocity on surface of bath. General use of technique expected to involve additional charging and handling devices

USE of oxygen in increasing the output of steel from open-hearth furnaces gives every promise of being one of the outstanding developments in the steel industry for many decades.

At the Cleveland district plant of Republic Steel Corp., results have been obtained by the application of oxygen to the open-hearth bath which have increased production of furnaces to which this technique had been applied by more than 50 per cent. There is every reason to believe that under ideal conditions and in furnaces specifically designed for this type of operation an even greater increase in production can be obtained.

While Republic lays no claim to being the first to employ the oxygen technique, it has been in the forefront in this development and in turning this development into practical production. Two of 14 open-hearth furnaces at the Cleveland district plant have been employing oxygen applied directly to the bath for more than three months in the regular production of steel. Results have been beyond the expectations of the management of the plant, according to J. L. Hyland, district manager of the Cleveland district for Republic.

With this development carried to a successful conclusion, its application to all of the 14 furnaces of the Cleveland district plant would, in effect, add a complete new steelmaking department of seven 200-ton open-hearth furnaces.

Republic has spent a large amount of money in the development of this process and at the present time has permanent installations to supply oxygen to seven furnaces, although only two have been using oxygen in production.

However, due to the creation of annoying smoke resulting from the oxygen application, the use of oxygen has been suspended in the two furnaces pending the construction of special smoke control devices, the engineering of which was recently completed. This construction should be completed in 60 to 90 days and it is believed the smoke will be substantially reduced. The devices are the Pease-Anthony type, and were selected by company engineers at the suggestion of the Arthur D. Little Co., Boston.

Oxygen is used in two ways at its open-hearth shop. First, to enrich the combustion air during the charging and melting period and second, as a bath reagent for the purpose of increasing the temperature and speeding up the reactions in the bath during the refining period. It is to this second use that the management of the plant accredits reduction in time to produce a heat of steel from 12 hours to between 6 and 7 hours.

Various techniques have been used during the three-month production period. At first the oxygen was injected into the bath through a lance thrust through a wicket hole into the metal bath to the depth of 6 to 10 in. However, the rapid destruction of the lance made it desirable to attempt a new technique which is now being utilized and is producing exceptional results. The oxygen now, instead of being blown into the bath, is impinged on the surface of the bath at high velocity eliminating the necessity of submerging the lance.

Effect of the oxygen addition is not dissimilar to the making of steel by the bessemer process except that oxygen, rather than air is used in the bath thus increasing the temperature, hastening the oxidation of the impurities and the reduction of the carbon content.

General use of this technique will of course mean drastic changes in the design of open-hearth furnaces and plants. For example, to apply this technique to all 14 of the Cleveland district open-hearth furnaces would mean that the present hot metal and scrap handling equipment would be woefully inadequate. More charging machines, more hot metal handling devices, more crane capacity, in fact, more of almost everything used within the plant would have to be available. New techniques in every operation would have to be perfected to coincide with the speeded up schedule.

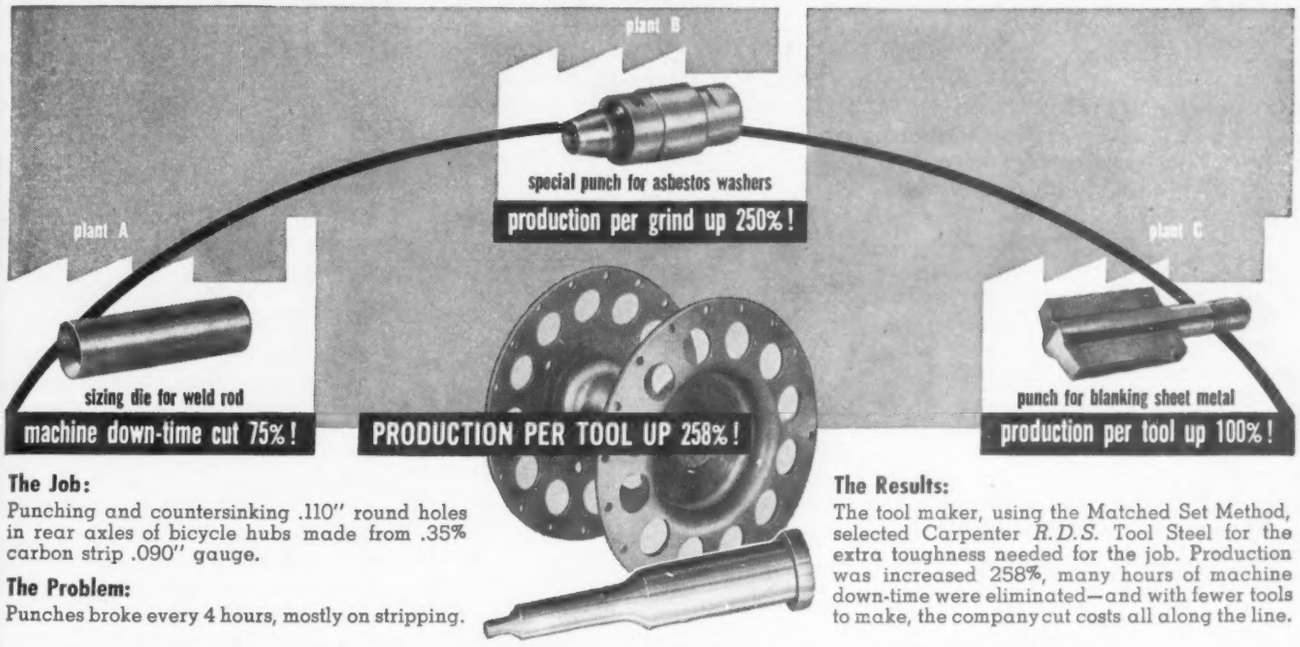
The two furnaces to which the process has been applied to date are Nos. 12 and 14, two of the furnaces at the farthest end of the open-hearth building. This was necessary in order to prevent interference with other operations, particularly during the time of the oxygen use.

It has been found that the temperatures developed have been, at times, high enough to be destructive to the brickwork and change in the design of furnaces is indicated.

Extension of the practice to the other furnaces in the shop would provide a greater degree of integration, since the finishing capacity of the Cleveland district plant has exceeded its steel production. A considerable amount of the steel rolled on the company's 98-in. hot strip mill in Cleveland has been brought from Youngstown, O. It is noteworthy that the oxygen development has been so successfully applied in Cleveland where in 1886 the first experiments in the United States with basic hearth steelmaking were conducted.

It is of course to be recognized that the commercial use of this process will depend upon the production of low cost oxygen. Republic is confident production of oxygen at prices which will make its use in open hearths economically practical is not far in the future.

These plants are Cutting Tool Costs, Boosting Machine Output . . *you can, too!*


plant A
sizing die for weld rod
machine down-time cut 75%!
plant B
special punch for asbestos washers
production per grind up 250%!
PRODUCTION PER TOOL UP 258%!
plant C
punch for blanking sheet metal
production per tool up 100%!

The Job:
Punching and countersinking .110" round holes in rear axles of bicycle hubs made from .35% carbon strip .090" gauge.

The Problem:
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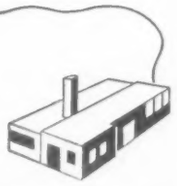

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Engineering News *at a Glance*

TO STUDY METAL POWDERS: Research project to improve metal powder industrial techniques is being sponsored by the industrial and development division of the Office of Technical Services, it was learned recently in Washington. Stevens Institute of Technology, Hoboken, N. J., is to carry out the research under a 6-month "actual cost" contract for which an allotment of $22,500 already has been authorized. The school will test iron powders furnished by domestic producers to determine factors affecting physical properties most suitable for widespread industrial application of powder metallurgy. Particle size, sintering methods, chemical composition, density and other conditions influencing the utility of powders will be studied.

MOLYBDENUM IN "CHUNKS": In Pittsburgh, it was learned, Westinghouse Electric Co. recently was successful in producing molybdenum in "chunks" of large size and multiplicity of shapes. Since molybdenum melts at about 4748° F, it cannot be cast like other metals to form large solid pieces, but must be compacted by means of powder metallurgy. The new process removes restrictions of both size and shape, and permits manufacture of pieces in any shape that can be molded. It can be round, square, with fins, angles or holes, and with much larger overall dimensions than heretofore reported possible. Cost per pound is said to be reduced to roughly one third.

DOUBLE MEASUREMENTS: Armour Research Foundation of Illinois Institute of Technology reports the development of a torquemeter capable of measuring both average and instantaneous torque, and which makes use of a small compact pickup unit that is easily installed around a short length of ordinary shaft. Consisting of two helical coils located coaxially with the shaft, the pickup unit forms two arms of the bridge circuit. Torque is measured by detecting magnetic and electrical changes due to torsional stress in the material comprising the shaft surface.

DELIVERS HUGE ORDER: Among the largest single orders for universal testing machines ever placed with any company in the United States is now being delivered by Baldwin Locomotive Works to the Pittsburgh Testing Laboratory, it was learned recently. The six machines are of the Baldwin-Tate-Emery universal testing high-column type, hydraulically operated, for use in tension and compression tests on various kinds of materials. Five of the machines are of 300,000-lb capacity while a smaller one is of 200,000-lb capacity. When installed, dial indicators of the machines actually will sit on the floor, while the bottom of each will rest in a pit 31 in. below the floor.

PROCESS FOR DIESEL FUEL: Method for producing a high quality diesel fuel from virgin gas oils or any other gas oils having a similar makeup was invented recently by Herbert H. Meier of Baytown, Texas. The invention, now assigned to Standard Oil Development Co. of Delaware, provides, by means of a hydro-forming operation, for the conversion of the simpler naphthenes into aromatics and the solvent extraction of the latter from gas oils.

"ANTIQUED" EFFECT: A new material that produces a rich oxidized or "antiqued" effect on sterling and silver-plated products was developed recently by Hanson-Van Winkle-Munning Co. According to the Matawan, N. J. concern, no electric current is required. Work is simply immersed in a solution called Platin-Nig.

FOUNDATION MAKER: New method of compacting sandy soil to increase its load-bearing capacity before starting construction work uses a vertical cylindrical vibrator powered by a motor especially designed by General Electric Co. to operate within the vibrator while it is submerged in wet sand. The huge machine, which is handled by a crane, compacts soil by combined action of a jet of water and high-speed vibration induced by the motor. Referred to as vibroflotation, the method diminishes volume and permeability of soils, lessens active soil pressure and increases passive soil resistance.

CROSS-COUNTRY SKY BELTS: Great expansion in conveying belts for use in outdoor cross-country purposes is expected by the industry, according to E. W. Stephens, Akron manager of belting sales for Goodyear Tire & Rubber Co. Two big jobs the industry hopes to be doing soon are: Carrying 2 to 5 miles the tons of earth that will dam the Missouri river, 65 miles north of Bismarck, N. D., and pouring a steady stream of coal into Youngstown steel furnaces on a 34-mile belt across mountains, rivers, railroad tracks and highways from Pennsylvania coal fields. This belt will be high enough off the ground to discourage anyone along the way who might want to reach in for a free handful or so. Lightweight bridges will be used to traverse rivers and highways. Latest wrinkle is to make use of the returning belt, which customarily idles along under the working belt. It is now possible to set the returning belt out at a slight angle so it also can be loaded to carry materials in the opposite direction.

BOUNCES FLYING STEEL: In Kansas City, United Safety Service Co. recently was host to members of the Division of Labor Standards of the Department of Labor for a demonstration in which a pair of clean plastic safety goggles withstood the impact of a sharp piece of steel flying at a speed of 240 mph. Tests applied to the goggles were part of a conference conducted in co-operation with Missouri State Division of Industrial Inspections.

TO DISCUSS MAGNETIC PARTICLES: Use of magnetic particle inspection in the welding field is to be discussed at the Magnaflux Corp. sponsored conference, scheduled in Chicago at the Congress hotel, May 8 and 9. Meetings are being planned on the basis of an open forum, with discussion leaders selected from various fields in which the inspection method proved successful. According to Magnaflux, fluorescent penetrant inspection as applied to the inspection of welds in nonmagnetic materials also will be given a place on the program. Further details concerning the event may be obtained by contacting the Chicago company.

FAVORED AS MATH SHORTCUT: Greatest feature in the use of decimal dimensioning is it eliminates time-consuming, error-producing operations of converting decimals to fractions and back to fractions again. Survey by the aeronautical drafting committee of the Society of Automotive Engineers, made among airlines operators and manufacturers of planes, powerplants, propellers and accessories, discloses 80 per cent now employs decimal dimensioning or contemplates early adoption. Users explain the practice contributes to speed and to accuracy both in design and manufacture. Decimals are carried to two, three or more places to satisfy varying tolerance requirements. According to the survey, in the aeronautical industry

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Finishing a 49"x75" Backing-Up Roll in a Mesta Heavy Duty Roll Grinder

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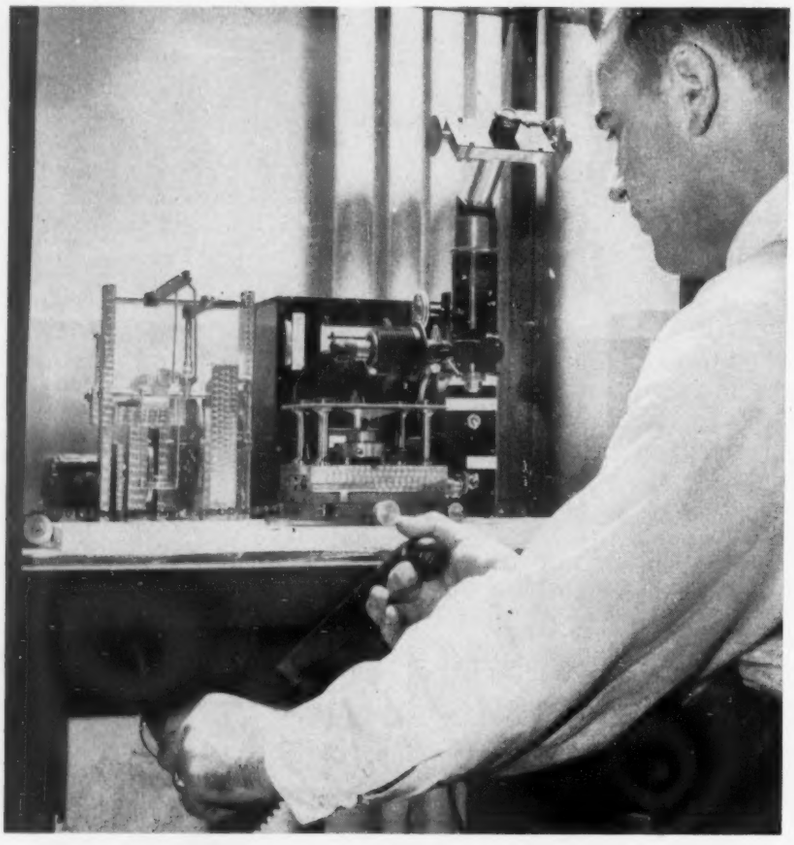
63 per cent already use the system, 37 per cent is using it for some purposes. In the propeller branch of the industry 80 per cent of the manufacturers use the system exclusively.

UNFREEZING A BATH: In restarting a frozen liquid carburizing bath—method of impregnating steel surfaces with carbon and small amounts of nitrogen to improve strength and wear resistance—remelting hazards are completely avoided by following a few precautions, according to R. S. Komarnitsky in a paper distributed in reprint form by Ajax Electric Co. Inc., Philadelphia. Before the bath freezes, he states, insert a steel wedge in the center of the bath. Tip of wedge should touch bottom of the pot, while the nose should protrude at least 4 in. above the salt level. Do not remove wedge until the bath is solidified completely, as molten salt may be forcibly blown out through the created opening. Before remelting, the wedge is removed by tapping it with a hammer. Space occupied by the wedge will then provide a vent for entrapped gases, expanding during remelting. It is pointed out that these precautions are not necessary in furnaces with closely spaced electrodes, or in those with wide spaced electrodes equipped with starting coils.

OIL FOR CYCLOTRONS: Initial application of a new oil developed by Gulf Oil research laboratories is being made in the cyclotron now in operation at the University of Pittsburgh. The oil is formulated to withstand the catalytic action of large amounts of copper used in cyclotron production of radio-active elements. In the installation, some 467 gallons of oil are used to bathe 18 miles of copper ribbon weighing 18 tons, coiled around the poles of a 90-ton electromagnet. The two copper-bound poles stand almost submerged in large tanks of the cooling cyclotron oil, which prevents destruction of the coils by the heat generated. From the tanks, the oil circulates to heat exchangers of running water, then returns to the coils.



GAGES STEEL GRAIN: In continuous use at the Kearny, N. J. laboratory of United States Steel Corp. of Delaware, device in the accompanying view measures the hardness, not only of a piece of steel one may feel in his hand and examine with the naked eye, but also of microscopic grains within the steel. Still more minutely, it can gage the hardness of a single steel grain at as many as three points within the breadth of a human hair. The Kearny designed device operates by indenting the polished surface of a metal sample. Its diamond-point penetrator under a load of a very few grams leaves a square mark that rarely can be seen by the naked eye. The diagonals of this tiny square indentation are measured in microns, or thousandths of a millimeter, and the reading related to the load placed on the penetrator so hardness may be computed. In the illustration, the penetrating unit is shown at the left, and at the right is a mechanical stage equipped with a microscope capable of magnifying the steel test field 500 to 1500 times

RAILROADS THROTTLE SMOKE: Based on reports from various operating officials received by Bituminous Coal Research Inc., Pittsburgh, Pennsylvania Railroad has the largest number of jet-equipped locomotives—nine road engines and 320 switch engines—with Louisville & Nashville Railroad 212; Southern Railroad 195; Norfolk & Western 194; Baltimore and Ohio 182 and Chicago, Milwaukee, St. Paul & Pacific Railroad 175, following in close order. Several roads report having 100 per cent jet installations. These include Indianapolis Union Railway, Island Creek Fuel & Transportation and Long Island Railroad.

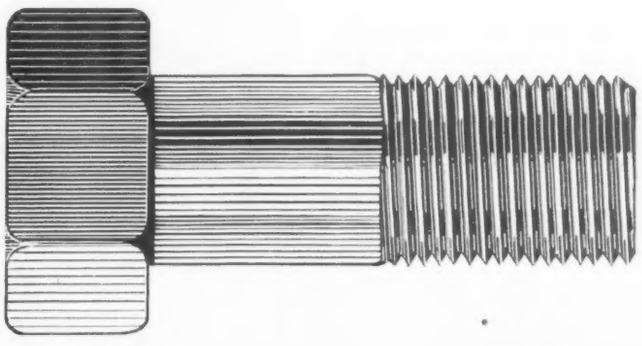
SPEEDY FORMING TECHNIQUE: From Little Falls, N. J., Instrument Specialties Co. reports development of a manufacturing method which assures quick delivery of parts comparable to those made from permanent tooling. Specially designed equipment by-passes such operations as shearing, bending and piercing to assure high precision and fast delivery. The method is said to be of particular value in producing pilot lots, establishing production tolerances as well as for true short-run jobs where total quantity is small, and conventional tooling costs are excessive. The company states the technique may be applied to any heat treatable alloy, besides beryllium copper.

SUBDUES SHOCKS: Rubber insulators currently manufactured by United States Rubber Co., New York, isolate shock so completely that sensitive instruments in a research lab less than 50 yards from the rubber-mounted machines can be operated without interference. First use of the insulators was for mounting 13 jolt machines, weighing 3000 to 22,000 lb, in the foundry of the new Wright Aeronautical Corp. aircraft engine plant in Woodridge, N. J. Here each of the jolt machines is secured to a large concrete block (weighing up to 40,000 lb) that rests on the rubber mountings. All 13 machines may be operated without setting up vibrations in surrounding areas.

Six hired men,

plus the power of a bull on a treadmill (to blow the fires), were combined in 1843 to produce 500 bolts daily, an impressive achievement at that time.

This was the crude set-up in the Connecticut blacksmith shop of Micah Rugg. His astounding production record of 500 bolts a day was the talk of the trade, and other bolt manufacturers sat up to take notice. From early beginnings like this, the metal fastener business grew to its present size and importance, reaching its greatest development in the United States. CHANDLER PRODUCTS CORP., manufacturers of cold wrought engineered products, is proud to be a member of an industry pioneered by men like Micah Rugg. Today, however, instead of using the power of a bull on a treadmill, and the help of six hired men, we have ingenious automatic machines and crews of skilled mechanics. Standard makes or special designs, metal fasteners of uniformly high quality flow from our plant constantly. They help hold together the motors and machines of today and tomorrow.



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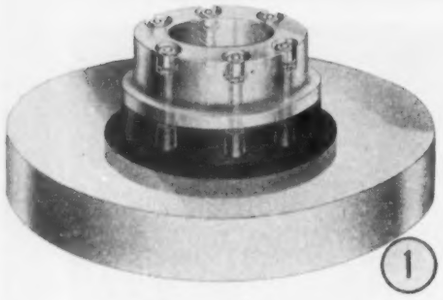


Method of

Drilling and Tapping Carbides

To Expand Their Applications

DEVELOPMENT of a method of mounting or attaching carbide parts with screws and studs is expected to greatly expand the potential fields of applications for carbides. Heretofore, use of large sections of carbides has been handicapped to some extent by the fact that carbides are unmachinable to all practical purposes in their hardened state, and therefore cannot be drilled or tapped satisfactorily.

A process in which machinable materials are solidly embedded in the carbide parts wherever the parts are to be drilled or tapped overcomes this objection, according to Carboloy Co., Detroit, originator of the process. Ability to use tapped blind holes in the attaching side of the carbide means that large "wear parts" may be bolted down rigidly at the same time presenting an unbroken wear surface, as shown in the dies illustrated.

Approximate location of the point or points of attachment and the number of such points are determined when it is desired to attach carbides by means of studs, screws, etc. The part is then provided with the machinable "inserts" which may or may not be drilled and tapped before shipment by company.

Although applications have been made for actual manufacturing of various parts large and small, there is a great variety of potential applications, especially in compound, progressive and segmental dies, particularly where blanking is done, the company states. Other possible applications are wear parts in fixtures, crank guides, cams, liners for molds and mills, punches for stamping, machine ways, guides, work rests and shoes, and wear plates that are included in precision instruments.

In using this process in dies, it is found that the ability to attach carbides with threaded parts has the advantage of permitting the carbide to seat solidly against the back-up metal, greatly increasing impact resistance. The development also performs satisfactorily where expansion problems are involved. The hole or holes in the support member may be countersunk and made slightly larger than the bolt diameter. The bolts can then be screwed into the "threaded carbide" and spring loaded, insuring firm seating of the carbide, and allowing for creep in case of differential expansion.

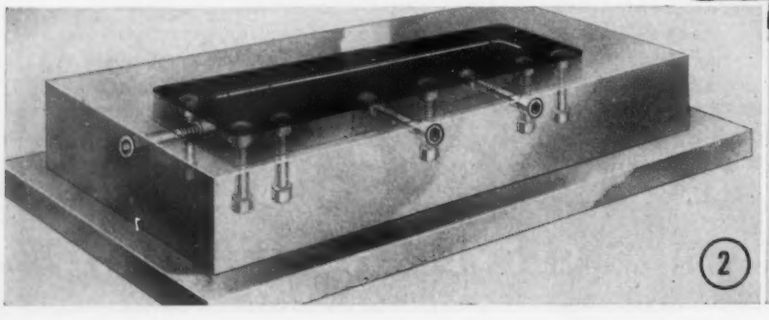
An expectation arising from the development will be a sizeable reduction in the cost of attaching large carbide parts, it is stated. Economical building-up of complex-shaped die or other part with groups of small individual units fitted together and held down, as a progressive die, may be accomplished.

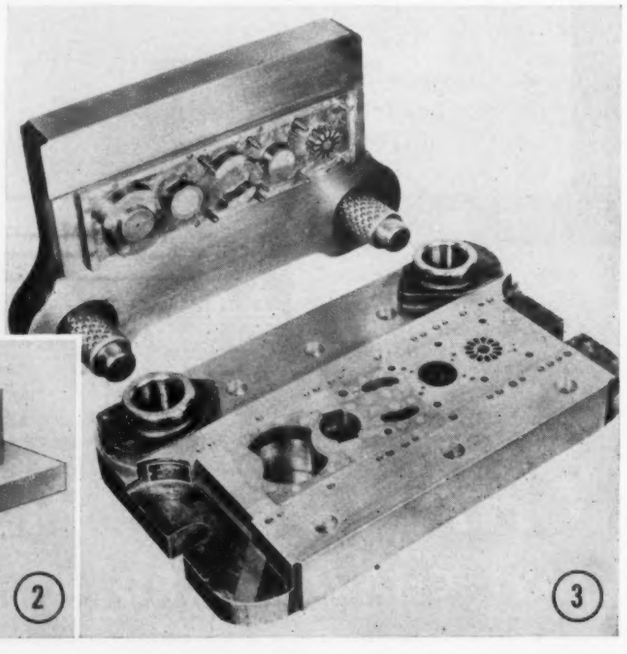
Carboloy reports that the process has been applied to mounting of parts as small as 5/16-in. OD and ⅜-in. thick. Large parts may be made either in one piece or in sections and attached by any desired number of threaded holes, as seen in Fig. 2. According to tests, a bolt will fail in tension before it will either pull the metal or injure the threads, so strong is the insert embedded in the carbide.

Fig. 1—Phantom view of carboloy punch and die set showing points of attachment, by means of studs, of the punch. Note inserts in carbide and solid steel backing for the punch

Fig. 2—Sectional carbide die assembled with new method. Carbide portion of deep drawing die is over 12 in. long and is assembled from four sections

Fig. 3—In this 5-stage progressive lamination die made by Lempco Products Inc., Bedford, O., female members for first, second and third stages are attached to steel die block using the new attaching method. Points of attachment are indicated by light spots above stud locations. Punches for three stages are also attached by this method





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Western Metal Congress

(Continued from Page 87)

3-ton bessemer converter. Special work includes measurement of machinability, work-embrittlement characteristics, damping capacity, directionality of cold-rolled strip and others.

High Temperature Service: After World War I, requirements of power-generating units for metals to withstand safely the loads at elevated temperatures necessitated by the increase in temperature and pressure sought by engineers to improve efficiency of the steam turbine, led to the development of a technique for determining the properties of metals temperatures up to incadescence, Francis B. Foley, superintendent of research, Midvale Co., Philadelphia, stated. Furnace designers and oil refinery engineers, he added, cognizant of this new development in testing, came to demand data on strength of metals at temperatures up to 1800° F. World War II also brought out the problem of developing metals with unusual properties for supercharger and gas turbine applications.

Ultra-High Temperatures: In a paper on the nickel and cobalt base high temperature alloys in the 1400-1800° F range, F. S. Badger Jr. and F. C. Kroft Jr., Haynes Stellite Co., Kokomo, Ind., pointed out that, with the wide range of applications for which these alloys are being considered, there is no general agreement as to the type of physical tests on which the development of improved alloys or the purchase of developed alloys can be based. The proper appraisal of the properties of these alloys, such as fatigue, stress-rupture, and creep coupled with formability and maintenance of strength and ductility for short periods of local or general overheating has resulted in a very difficult problem which must be met by the metallurgist, they said.

Gray Cast Iron: James T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, Ala., discussed the effect of graphite on the unique properties of cast iron such as corrosion resistance, damping capacity, freedom from galling and seizing, resistance to heat checking and freedom from notch brittleness. Mechanical properties were considered in the light of the graphite forms and especially the difference in the effect of the graphite on the tensile and compressive strength with the result of effects on bending, twisting and shock resisting properties.

High Chromium Irons: H. D. Newell, chief metallurgist, Babcock & Wilcox Tube Co., Beaver Falls, Pa., reported that under like conditions of exposure, relatively pure high chromium alloys containing up to 30 per cent chromium show good stability against sigma phase precipitation as compared with usual commercial alloys, but these pure alloys show the same degree of hardening at 475° C, indicating the latter phenomenon is primarily a function of the chromium content. He also reported a case of aging embrittlement in service of type 405 alloy, heretofore thought immune to 475° C embrittlement.

Residual Stresses and Fatigue: J. O. Almen, head, mechanical engineering department, General Motors Research Laboratories, Detroit, said that the experience most metallurgists have had with residual stresses, has been unhappy. Residual stresses, trapped stresses, internal stresses —whatever name is used—mean cramps, because they manifest themselves to the heat treater as warped and rejected parts. The metallurgist's objective has therefore been to avoid so far as possible, all materials and processes that will develop residual stresses.

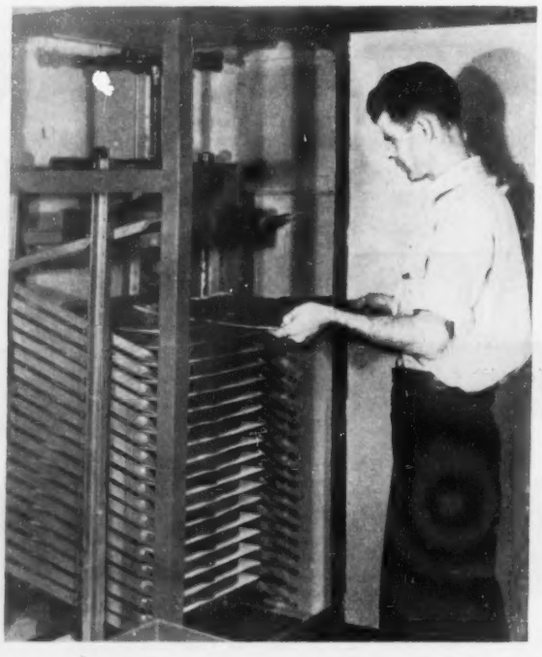
Mr. Almen showed that strength of structural materials can be greatly increased by development of residual stresses of proper orientation and magnitude. Beneficial or harmful residual stresses will necessarily result from normal heat treatment and mechanical operation. Metallurgists and engineers must understand the effect of such residual stresses in order that they be applied advantageously in normal processing of machine parts, he said.

X-Ray Diffraction: Kent R. Van Horn, manager, Cleveland research division, Aluminum Co. of America, Cleveland, said that x-ray diffraction probably is the most positive means for identifying hard spots, inclusions or unknown material. The method also is useful in determination of phase diagrams. These data are the basis of industrial melting and heat treating practices. Useful information has been obtained in the analysis of wrought products such as grain size, the recrystallization temperatures and extent of recrystallization as well as directional properties.

Electron Microscopy: David Parker, research laboratory, General Electric Co., Schenectady, N. Y., explained that electrons have wave properties that can be used to form images of high resolving power. In theory the resolved detail should be about 100,000 times finer than can be observed by using visible light. In practice, electron microscopes can give useful magnification about 200 times greater than light microscopes; sharp images at magnifications up to some 300,000 diameters.

Electrons are badly absorbed and scattered by air as well as by ordinary thickness of specimen materials. It is therefore necessary to have the electron pass in an evacuated space and to use extremely thin specimens. The problem of using the electron microscope for metallography is, consequently, that of obtaining thin sections. Thin sections of metals themselves have not yet provided much information although they can be made. The best electron metallography at present is done on extremely thin replicas of metal surfaces. These replicas have been made of plastic and of silica and have shown most remarkable details.

Mechanical Testing: One way to find



FILTER PRESS: Suitable for the filtration of many liquids including alkyd resins, solvents, paint, varnish and cutting oils, this new vertical steel filter press of cast iron construction combines plate and frame in one casting to permit easy removal of cakes through an individual latching arrangement of each frame. Developed by Youngstown Miller Co., subsidiary of Walter Kidde & Co. Inc., Belleville, N. J., the press has filtering area of 31 sq ft with 2 cu ft cake space

New Giant Bases Built from Welded Plate

BY A. E. LOFQUIST, MGR. OF FABRICATED PLATE DIV.
R. C. MAHON COMPANY, DETROIT, MICHIGAN

Press beds and die bases weighing 23 tons to 25 tons each, formerly built from structural members, are now being fabricated from plate for lower costs, greater strength and permanent rigidity. The former design, involving channels, I-beams and angles, had stresses concentrated at the joints; it was ungainly and costly, requiring expensive layout and assembly. Redesign for plate construction has made stress distribution uniform, has given our customer a better product, with more attractive appearance.

The 25-ton press bed shown in Fig. 1 is one of 16 of this modern design, welded from ¾″ and 1″ plate. This pedestal, 11 ft.-4¼ in. wide, 19 ft.-6 in. long and 14 ft.-10 in. high, will be installed in a pit, its top flush with the shop floor and will support a giant press.

The base shown in the foreground of Fig. 2 is a 23-ton die bed, built from plate as heavy as 3″ thick and from formed sections.

Special procedures were not necessary to control warpage and distortion because proper design kept this to a minimum. Reasonable care was used to properly balance welding from side to side.

New Electrode Simplifies All-Position Welding

The large size of these weldments makes it impractical to use positioners in order to get all downhand welding, but the bases are turned over from one side to another and end to end, to eliminate vertical and overhead welding in almost all cases.

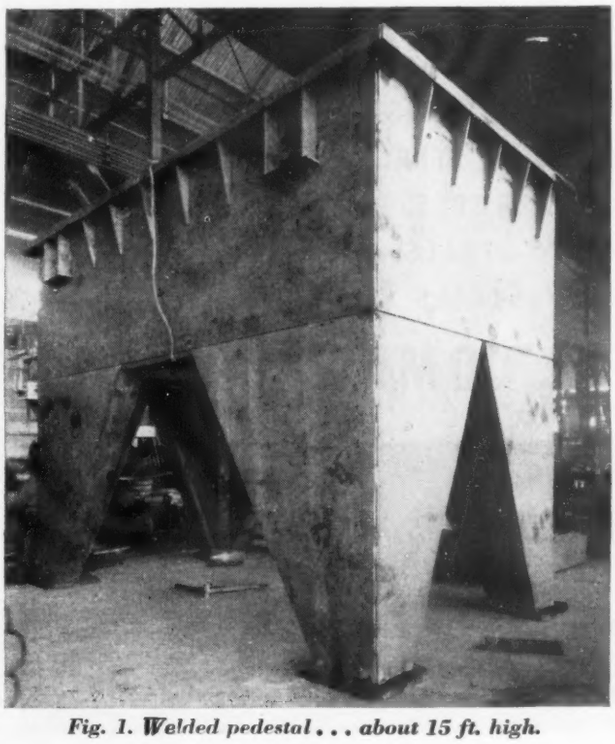


Fig. 1. Welded pedestal . . . about 15 ft. high.

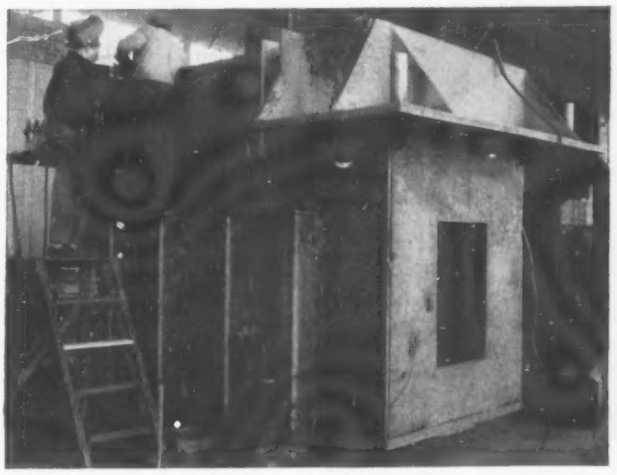


Fig. 2. Die bed . . . weight 23 tons.

In this welding, involving fillets, corner joints and bevelled butt joints in heavy plate, we have used the new Lincoln "Fleetweld 47" extensively so as not to sacrifice time or quality. It is also used for the welding of fillets in the lighter plate of various attachments and stiffeners.

In making horizontal fillets, we lightly drag the coating of the electrode on the flat plate, maintaining a space of 1/16″ to ⅛″ between the electrode and the vertical plate. This makes the weld "feather" into the vertical plate.

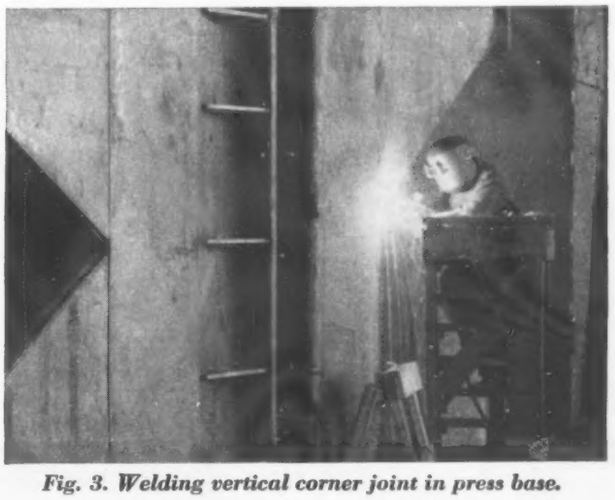


Fig. 3. Welding vertical corner joint in press base.

We use this E-6013 electrode in sizes as large as ¼″ for vertical welds, resulting in speeds up to 40% faster than with small size electrodes. Welds are made vertically upward with single pass weave.

Further information on the procedure for this electrode may be obtained by writing The Lincoln Electric Company, Dept. 154, Cleveland 1, Ohio.

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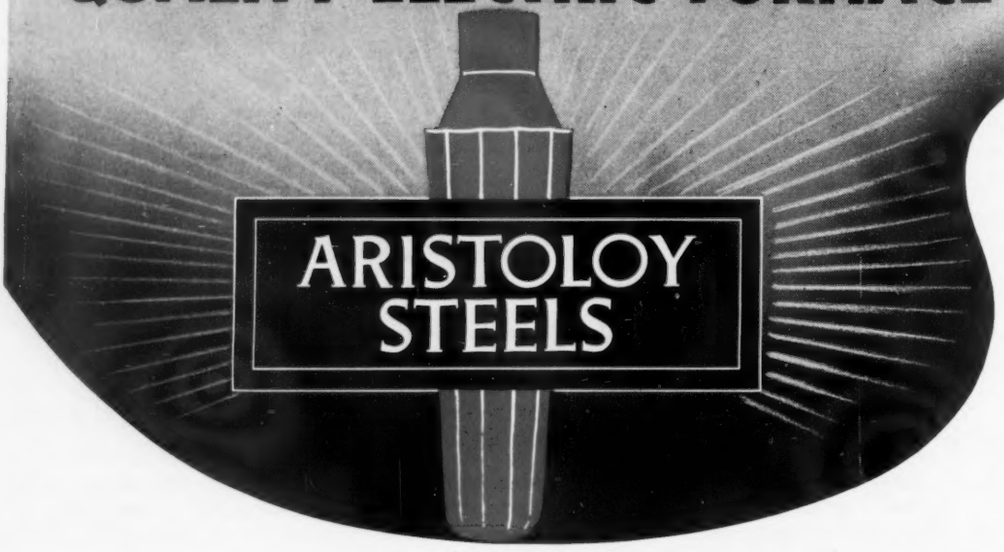

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out whether or not a cheaper material or process or design is satisfactory is to try it in production, said Arthur E. Focke, chief metallurgist, Diamond Chain Co. Inc., Indianapolis, but it takes only a few service failures to destroy customer acceptance built up through many years of reliable performance, or increased numbers of rejects or more complicated operations which may be required to process a cheaper material may result in greater rather than reduced overall cost.

The alternative to production trial, therefore, is to make enough mechanical tests first. This may vary from simple hardness, tension, compression, bend or torsion tests on prepared specimens to complicated wear or fatigue tests on the completed product. There is a need for more complete understanding of the significance of the results of mechanical tests, Mr. Focke said.

Fabricating Copper Alloys: In every industry there is naturally a tendency for manufacturers to try to broaden their horizon to produce bigger and better items, and to effect greater savings or profits by simplification of processes.

Many of these improvements are limited only by the power available or by the economics of the situation. However, Harry P. Croft, director, technical control and reasearch, Midwestern Division, Chase Brass & Copper Co., Cleveland, said there are certain operations which are limited in their scope by the inherent properties of the metals themselves, and some of these limitations, well known to manufacturers in the copper alloy industry, have not been generally passed on to consumers of the products. These limiting factors should be studied by fabricators.

The Aluminum Alloys: The greatly increased production facilities for aluminum products, and their position of improved price and availability relative to some of their less fortunate competitors, have widely expanded the market for this versatile metal, declared E. H. Dix Jr., assistant director of research, Aluminum Co. of America, New Kensington, Pa. Always a favorite for mass in motion, it is now finding new applications in the building industry, ranging from electrical wiring to farm roofing. It also is finding applications in many strange fields beyond the guiding hand of its forebears. Heretofore a knowledge of the physical metallurgy of aluminum alloys was required by only a few in such specialized fields as aircraft. Now, however, problems concerning these alloys are likely to confront many metallurgists who in the past have had only a casual interest in their metallurgy.

The Magnesium Alloys: In the past few years a number of developments have taken place in the magnesium industry which give promise of not only making better materials available but also of lowering their cost, said John C. McDonald, of Dow Chemical Co., Midland, Mich.

In the field of wrought metal production, melting now is carried out in large capacity reverberatory furnaces. The molten metal subsequently is handled through the alloying stages, and into the continuous direct casting machine with pumps. Very large forgings are being produced on new press equipment. The continuous rolling of sheet as well as the rolling of shapes has now been demonstrated.

In the foundry, chlorination of melts now is being practiced as a degassing process. Superheating still is being used for grain refinement although treatment with various carbon compounds has been proposed as an alternative. A new type of gate has increased both efficiency and the ease of promoting soundness.

A new development in arc welding by the inert gas shroud method is the superposition of a high frequency alternating current on the direct current. Less heating, smaller welds and the ability to join thinner sheets have been secured. Large and complicated draws now are being made from magnesium sheets with the use of heated dies.

Casting of Light Metals: Roy E. Paine, plant metallurgist, Aluminum Co. of America, Los Angeles, stressed the importance of choosing the right light metal alloy in making castings as they vary in castability, ease of handling and sensibility to the usual casting defects. They must also be considered in view of the application of the finished product as to mechanical properties, corrosion resistance, machinability and surface finish.

Also, he said, the design of the casting will depend somewhat on the alloy and method of production, i.e., sand, permanent mold or die cast. Other factors which must be considered in designing light metal castings are draft, shrinkage, parting line, coring, fillets, ribs, section thickness and machine finish allowance.

Inspecting Castings: Thomas E. Piper, chief materials and process engineer, Northrup Aircraft Inc., Hawthorne, Calif., said that castings of the same heat, while appearing alike, have structural and dimensional irregularities which show up in x-ray and precision inspection. He pointed out the need for scientific development and research to evaluate the effect of irregularities as shown by x-ray, Zyglo and magnetic inspection on the parent metal, and the necessity of scientifically controlling shrinkage, both primary and secondary, by a formula to enable the designer to design castings that a foundry will be able to cast.

Automatic Resistance Welding: The answer to improved living standards lies in a greater unit production per man per unit time and this, with increased earnings will raise our living standards, declared Malcolm S. Clark, president, Federal Machine & Welder Co., Warren, O. To accomplish this, he said, we need more automatic machinery and here is where resistance welding has the greatest possibilities.

Mr. Clark cited as one example the automatic chain making equipment where resistance welding is only one operation out of many which are performed in the machine. However, resistance welding is the key which makes automatic chain making possible.

Mr. Clark said that resistance welding, like many of the arts of production, has gone through the necessary steps of development and application until today it holds a very enviable position as one of the necessary tools of production wherever the fabrication of metals is concerned.

Resistance Welding Applications: J. H. Cooper, chief sales engineer, Taylor-Winfield Corp., Warren, O., pointed out the many unusual resistance welding applications of the past few years, such as the resistance welding of tank and aircraft armor; steel springs; firefighting ladders; jet rotor assemblies, propellers, landing gear; aircraft engine and supercharger impeller casing; manifolds and exhausts; landing mats; carbon dioxide capsules; instruments and gages; radar and other electronic apparatus; rockets; blitz cans, milk cans; fire extinguishers and many others.

He said there also has been a tremendous increase in the more commonplace applications and that literally millions of resistance welds have been made with incalculable increases in production and corresponding decrease in fabricating costs.

Electronic Welder Control: G. W. Garman, control division engineer, General Electric Co., Schenectady, N. Y., pointed out that the requirements of control for resistance welding machines may vary, depending not only upon the source of electric current, but also upon the type of machine, whether manual or automatic, and upon the type of process, whether spot, projection, seam or flash welding. In addition, the thickness and kind of material and the required consistency of welding all have a bearing on the required functions of the control equipment.

Majority of welders in use today obtain their power directly from a single phase power supply system. Other types of welders include energy storage, 3-phase and direct current.

Resistance Welding Electrodes: The function of electrodes and the importance

of good design in the selection of preferential alloys in resistance welding is too frequently overlooked or not fully appreciated.

As an example, said G. N. Sieger, S.M.S. Corp., Detroit, one of the most frequent causes of short life of resistance welding electrodes is the lack of appreciation of the significance of effective water cooling. The mere presence of water does not necessarily mean effective water cooling. Many seemingly correct designs are actually detrimental to long life and good performance. While the correct function of the resistance welding electrode is that of pressure transmission, current conductor and heat exchanger, he said, there would never be a heat generator nor yet a heat conductor like a soldering iron.

Thermit Welding: John B. Tinnon, vice president, Metal & Thermit Corp., New York, stated that the properties of Thermit steel are approximately those of forged steel. Thermit welding, in which iron oxide is reduced by means of granular aluminum, finds its principal applications in the fabrication and repair of large machinery parts, welding of rails, the continuous production of heavy steel parts and the like. In making a Thermit weld, a mold is prepared around the part to be welded. The parts then are preheated to about 1700 to 1900°. The Thermit steel is at about 5000° F when poured.

Shielded Arc Welding: Thomas E. Piper, chief materials and process engineer, Northrup Aircraft Inc., Hawthorne, Calif., said that the inert gas shielded arc welding process, originally developed for use on magnesium alloys, has now been extended to the welding of aluminum, copper and steel alloys. It is the fastest and most efficient method of welding where its application permits.

Standard arc welding equipment may be used for this process, consisting of a direct or alternating-current motor generator set and a welding torch that permits flow of monatomic gas such as argon through the torch enveloping the weld that inhibits oxidation of the molten weld bead and eliminates the use of flux.

Welded Steel Structures: LaMotte Grover, welding engineer, Air Reduction Sales Co., New York, said that further research is underway in England as well as in the United States which will provide a more rational method of design, involving the "plastic theory" for frames with restrained connections. Where such methods have been applied, he said, they have permitted very large savings in the weights of columns as well as beams, through a better balanced design and more efficient utilization of the properties of steel materials.

Considerations for economy often tend to lead designers to the use of greater thicknesses of material for welding construction. With the constructional steels available today, it seems advisable to place some limitations upon the maximum thicknesses to be used under various circumstances. Therefore, he said, in the detailing of heavy welded structures at present, economy must sometimes be sacrificed to some extent.

Welding in Production: In the manufacture of heavy duty earth-moving equipment, Earl B. Griffeth, plant superintendent, Wooldridge Mfg. Co., Sunnyvale, Calif., said his company finds it economical to use both manual and automatic welding and cutting methods extensively. In producing a self-powered scraper, for instance, these methods are used in fabricating the wheels, the blade base, yoke arms, king pin, box beams and the main scraper frame.

Welding High Temperature Alloys: With the proper technique, most parts that can be made from mild steel or stainless steel also can be formed and fabricated from the nickel base Hastelloy alloys and the cobalt base family of alloys for high temperature service. These super alloys have been welded by the oxyacetylene, metallic arc, atomic hydrogen, Unionmelt, resistance (spot and roller seam) and Heliarc (both manual and mechanical) methods.

Theory of Corrosion: R. M. Burns, chemical director, Bell Telephone Laboratories, Murray Hill, N.J., explained that corrosion is an electrolytic process by means of which metals undergo chemical reactions with nonmetallic elements of their environment, producing chemical compounds which are either oxides or salts. There are two general classes of corrosion reactions, the first a wet or hydrogen replacement process in which the corroding metal replaces hydrogen from water, and the second a dry process involving direct combination of metal and nonmetallic elements as exemplified by oxidation and tarnishing reactions.

Protective Coatings: Mr. Burns presented a second paper in which he pointed out that about one-third of the steel, one-half of the aluminum and nearly all of the magnesium produced in the twentieth century has been manufactured in the past eight years. The greater proportion of this vast tonnage of metal has been protected from corrosion by metallic and organic coatings.

Mr. Burns said that nickel is the most important cathodic coating for general purposes. A superficial layer of chromium is widely used for appearance while the underlying nickel provides the protective quality of such coatings. The most important anodic coating metal is zinc, but its protective value depends upon coating thickness. Life of such coatings may be extended by using chromating and phosphating treatments. Lead found considerable use during the war as a substitute for zinc and appears to have given satisfactory service. An aluminum coating has been largely used on aluminum alloys since it forms a highly protective coating in most atmospheres.

Organic finishes serve as barriers between the metal surface and the environment. Since paints are not impervious to moisture, the use of inhibitive pigments in the primer coating offers a large measure of protection. There have been many very important developments in the organic coating field, including the new resins of superior quality.

Preparation of Surfaces: James R. Ewing, secretary, Solventol Chemical Products Inc., Detroit, said that the approach to preparation of metal surfaces for protective coatings involves (1) type of protective coating or base for the protective coating, (2) surface condition required for the particular type of coating and (3) the most efficient and economical method of obtaining the desired surface condition. He said that many variables have been eliminated through research and co-ordination in the metal industry during the past few years and that, today, standards of high quality of surface conditioning may be established by applying better known methods of metal cleaning and surface treatment prior to application of protective coatings.

Unit Air Conditioners Offered in Three Sizes

Manufacture of newly-designed self-contained air conditioning units for installation in commercial establishments has begun at the Sturtevant Division of Westinghouse Electric Corp., Hyde Park, Mass. Being made in 2, 3 and 5 hp sizes, the units are as much as 15 per cent smaller than previous models of similar capacity.

Conditioners are quieter, easier to service and as much as 20 per cent lighter.

New Process Form-Grinds Spiral Tools to Order

Using equipment designed by their own engineers exclusively for the company's use, the J & S Tool Co., East Orange, N. J., is form-grinding spiral form tools and spiral-fluted form drills to customers' specifications. These tools are highly rated by many manufacturers for their exceptional cutting qualities. Heretofore, their high cost made extensive application impractical, but improved methods developed by this company are said to reduce their cost.

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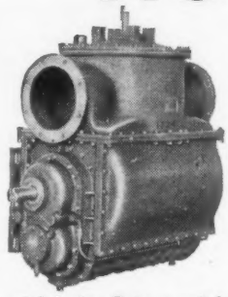
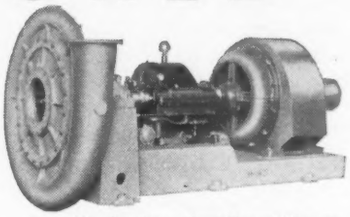
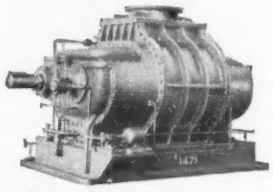


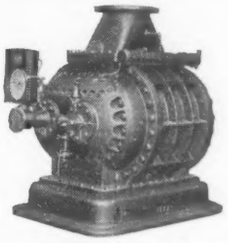
Special design Rotary unit for scavenging Diesel engine



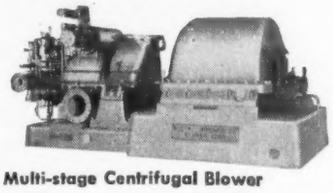
Single-stage Centrifugal Blower



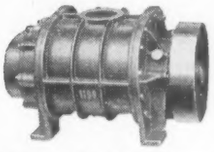
Rotary Positive Gas Pump



Positive Displacement Meter



Multi-stage Centrifugal Blower



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Ventilating a tunnel: Fresh air was carried eight miles inside a mountain tunnel by using a large R-C blower at each portal with a portable booster inside, which advanced with the work. A substantial amount of time was thus saved after blasts, and workmen were always supplied with clean, fresh air.

Keeping fish air-conditioned: Aeration from R-C blowers keeps fish alive and active while being transported in fresh water tanks, by train, from Minnesota lakes to eastern seaboard. Unique drive methods combine gas engines, electric motors and power from the axle of the railroad car.

Preventing mine explosions: Inert rock dust was driven by an R-C Blower through a 3½" hose from the portal to exact spots where explosives were being used. By a "smothering" action, this inert dust prevented accidental explosions.

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TITLE _____

Aluminum Coated Steel

(*Continued from Page* 81)

standards cannot be used for calculations involving aluminum coated steel.

Aluminum-coated steel will withstand moderate forming and drawing operations without peeling or flaking of the coating. The material can be bent 180 degrees cold over a diameter equal to twice its own thickness without damage to the coating or to the base metal. Adequate die clearance and lubrication are necessary in drawing operations to prevent destruction of the aluminum coating by the scraping action of the dies. Recent experiments indicate that aluminum-coated steel has good spinning properties.

The direct current conductivity of aluminum-coated steel is somewhat better than that of solid steel, due to the aluminum surface which has about four times the electrical conductivity of steel. This property is valuable where the combination of magnetic permeability and electrical conductivity is required, for example, in magnetic shields.

These advantages are greatest in the case of high-frequency alternating currents. Such currents tend to avoid the core of the conducting element and to travel in outside or surface layers of the conductor. Consequently, when aluminum-coated steel is used as a conductor for very high frequency alternating currents, as the frequency increases the current density will increase in the aluminum surface, decrease in the steel base, and the electrical conductivity of the coated material will tend to approach that of solid aluminum.

Finishing: For many applications the surface of aluminum-coated steel is satisfactory as is and requires no painting. While the aluminum surface is reported to have good qualities it is not recommended for direct paint application. Surfaces to be painted should be given a Bonderizing treatment. A mill-Bonderized finish is available on coated strip that is to be fabricated into products that ultimately are to be painted.

Oxyacetylene welding can be carried out successfully on aluminum-coated steel. As a general rule a weld between two pieces of the material has maximum strength if there is continuous steel-to-steel contact and fusion. The aluminum oxide film always present on the surface of aluminum, and the oxide formed during the welding process tend to remain on the surface and prevent this steel-to-steel contact. As a result a flux must be used to carry the aluminum oxide to the surface as slag. If the oxide is permitted to mix with the molten steel a porous weld will result.

A satisfactory flux recommended by Armco is Solar welding flux No. 16GH, which is made into a paste with technical grade methanol having less than 2 per cent water content, and applied directly to the seam. Both the top and bottom of the seam should be fluxed before welding. Another flux which has given satisfactory results is Fluxine 18. If a filler rod is used, it too should be fluxed with the same paste. Oxweld No. 1 HT steel rod has been used for filler metal. It is important that the flux be completely removed after welding, since in the presence of moisture the residual chemicals will attack the metal.

Arc welding may be carried out by using a shielded arc electrode, provided the electrode has a coating capable of dissolving the aluminum oxide. A mild steel rod called Raco Fer-Al, manufactured by Reid-Avery Co., Baltimore, is made especially for the arc welding of Aluminized steel. Coated stainless steel rods in either 18-8 or 25-12 analysis, offered by numerous manufacturers, also give excellent results.

Atomic hydrogen arc welding may be used satisfactorily, and often to an advantage, in the welding of the lighter gages of aluminum-coated steel. A flux, such as that used in the oxyacetylene welding process, must be applied to the edges before welding to bring the aluminum oxide to the surface. The filler rod, when used, should also be fluxed.

Resistance welding resembles the procedure used for aluminum more than standard practice for steel. Aluminum-coated sheets may be welded in the condition that they are received from the mill. However, to insure uniformly sound and strong welds, cleaning should be carried out when the surface is soiled by fabrication, handling, or the application of drawing compounds. A satisfactory cleaning procedure used by several fabricators is as follows: 1. Clean with a degreaser or hot soap solution; 2. rinse in hot water; 3. pickle in cold 3 per cent hydrofluoric acid; 4. rinse in running water to remove sludge; use of hot water will accelerate drying; 5. air dry and weld.

Both top and bottom electrodes should be dome-shaped and of high strength copper alloy. Hard-drawn copper electrode tips are not applicable. Because the aluminum coating lowers the electrical resistivity of the work, the material requires a higher energy input than uncoated steel of similar gage. The increase is higher for the lighter gages, in which the aluminum coating constitutes a larger percentage of the total thickness. Amperage requirements for coated sheets 0.018-in. and lighter will be up to 50 per cent greater than for plain steel, while at 0.080-in. thickness, only 20 per cent increase in amperage is required.

Adjustments for spot welding that have given good results in aircraft plants are given below:

(1) Current duration should be 2 cycles. Longer duration increases the tendency toward flashing and spitting.
(2) Electrode force should be about 625 to 700 lb when welding the coated sheet to similar material or to uncoated mild steel. When welding to stainless steel these values should be increased to 950 to 1000 lb.
(3) Adjust the transformer tap and the heat control dial to low current values, and carry out a series of welds in scrap material, increasing the current until flashing and spitting occur. The heat dial is then turned back, to reduce the current gradually, until spitting stops. This current setting will be higher than that for mild steel. The spot welds should be checked on test strips and with shear test specimens, and if satisfactory the work may be started at these settings.
(4) Squeeze time and hold time do not appear to affect the welds, and should be adjusted to the values that permit the desired rate of welding.

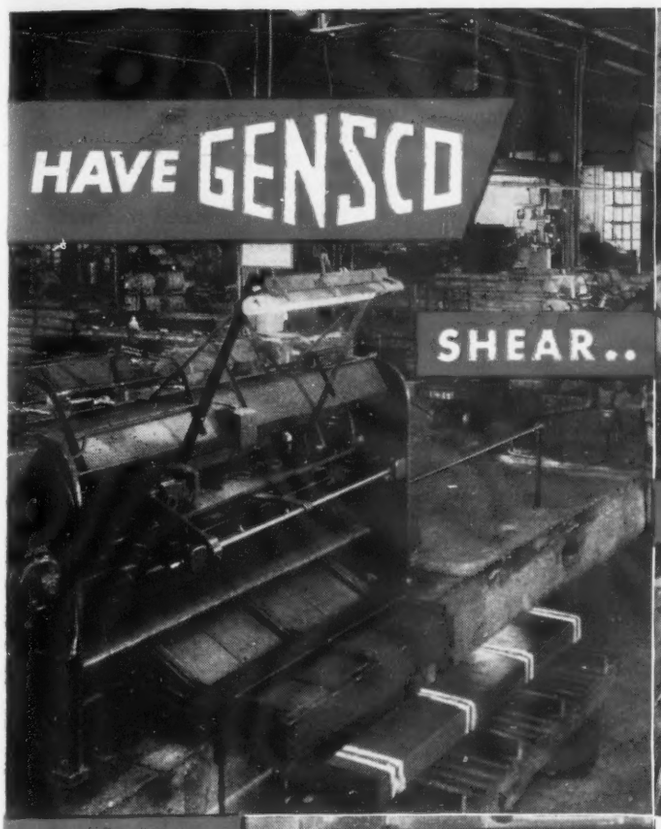
The above settings have given good results with 100 kva machines and with 0.020 to 0.040-in. material. If the work is to be done on a lighter welder, with lower amperage, current duration must be increased to obtain equivalent energy input. Smaller radius tips can be used to increase the current density, provided tests have shown adequate strength in the resulting welds.

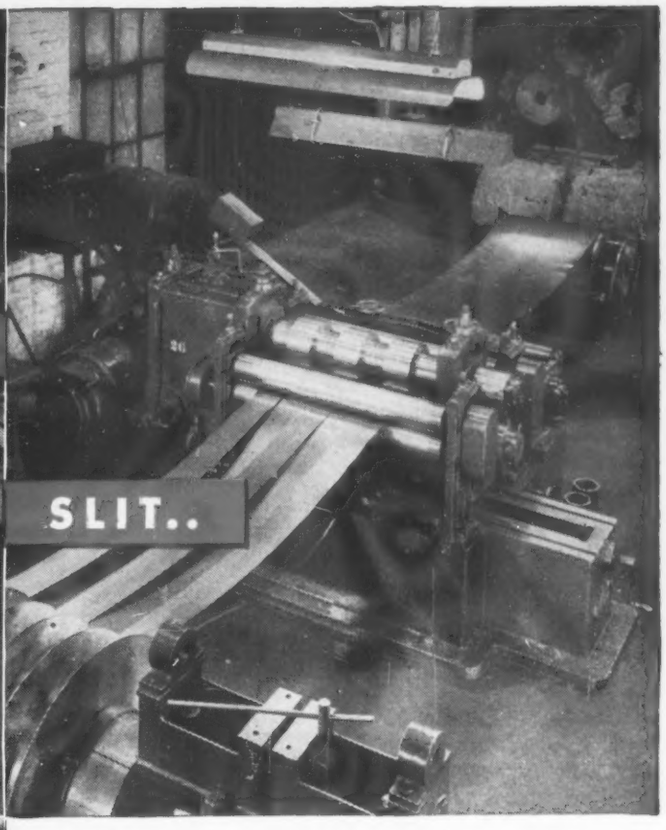
Due to the tendency of metals such as aluminum to alloy with the copper alloy spot welding tips, it is very neces-

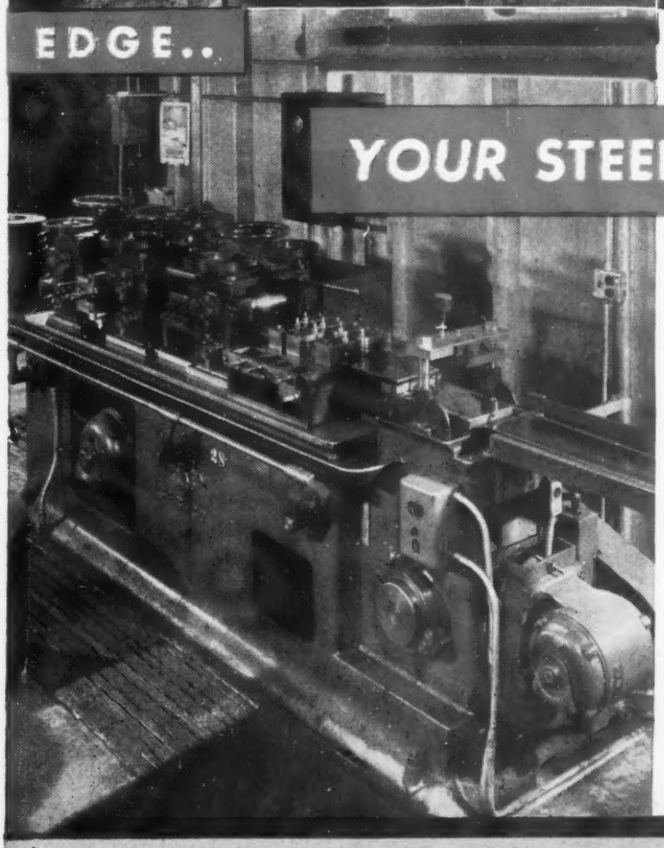
SOPT WELDING DATA FOR ALUMINUM COATED STEEL

Sheet Thickness Inches	Minimum Electrode Diameter and Shape Lower Electrode d Inches	Upper Electrode D	Net Electrode Force Pounds	Weld Time Cycles (60 per second)	Approx. Current Amperes	Minimum Weld Strength Pounds	Approx. Diameter of Fused Zone Inches
.020"	5/16"-1"R	5/16"-1"R	350	8	8700	450	.13
.025"	5/16"-1"R	5/16"-1"R	400	9	9500	625	.14
.030"	5/16"-2"R	5/16"-2"R	450	9	9500	800	.16
.040"	5/16"-2"R	5/16"-2"R	550	11	10400	1200	.19
.050"	5/16"-2"R	5/16"-2"R	700	13	11800	1750	.22
.060"	5/16"-2"R	5/16"-2"R	900	15	12800	2300	.25
.080"	5/16"-2"R	5/16"-2"R	1200	18	13800	3450	.29

(1) Material free from scale, grease and dirt
(2) Electrode Material
minimum conductivity—75% of copper.
minimum hardness—75 B Rockwell.
(3) Electrode is dome-shaped in all cases. Radius of dome is given for both upper and lower electrodes.
(It is advisable to make final machine setting with a slight amount of the copper-aluminum alloy on the electrode tips, since the spot welding will be done with the tips in this condition.)







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sary that the tips be effectively water cooled. This tends to lengthen the service life of the copper alloy tips and give more consistent spot welds.

Seam welding of aluminum-coated steel offers no special problems. In seam welding it is necessary to keep streams of water on both upper and lower rolls to obtain maximum cooling effect and to reduce excessive pick-up of the aluminum coating by the rollers. It is desirable that some provisions be made for the continuous removal of the aluminum alloy that adheres to the wheel electrodes despite the water cooling. Seam welders with double-knurl drive have proved satisfactory. The knurled pinions "doctor" the contact edges of the rollers and help make possible 6 to 8 hours of operation without roller change.

Brazing: Aluminum-coated steel can be satisfactorily brazed with a high-strength aluminum alloy brazing rod and a suitable flux. Aluminum alloy brazing rod No. X-716 and brazing flux No. 33, supplied by Aluminum Co. of America, are satisfactory. Eutectic Rod No. 190, supplied by Eutectic Welding Alloys Inc., is also reported to have produced a good brazed joint on aluminum-coated steel as far as water tightness is concerned. Copper-zinc-alloy rods and silver solder have not proved practical for production use.

The same technique of brazing is followed as when working with aluminum and aluminum-alloy sheets. Strength of the brazed joint in aluminum-coated coated steel is quite ample for many purposes; however, it should be remembered that a joint is only as strong as the union between the aluminum coating and the steel base. The brazing alloy will not bond with the steel in sufficient strength to fracture the steel sheet if a strength test is made on the brazed joint.

In general, the same difficulties which are met in soldering solid aluminum are encountered in soldering aluminum-coated steel. The insoluble aluminum oxide film always present on an aluminum surface prevents the solder from "wetting" the coating and from making a metal-to-metal union with the aluminum. One successful method consists of first electroplating the aluminum-coated steel with copper or nickel, and applying the solder to the plated surface.

Piston Patent Granted

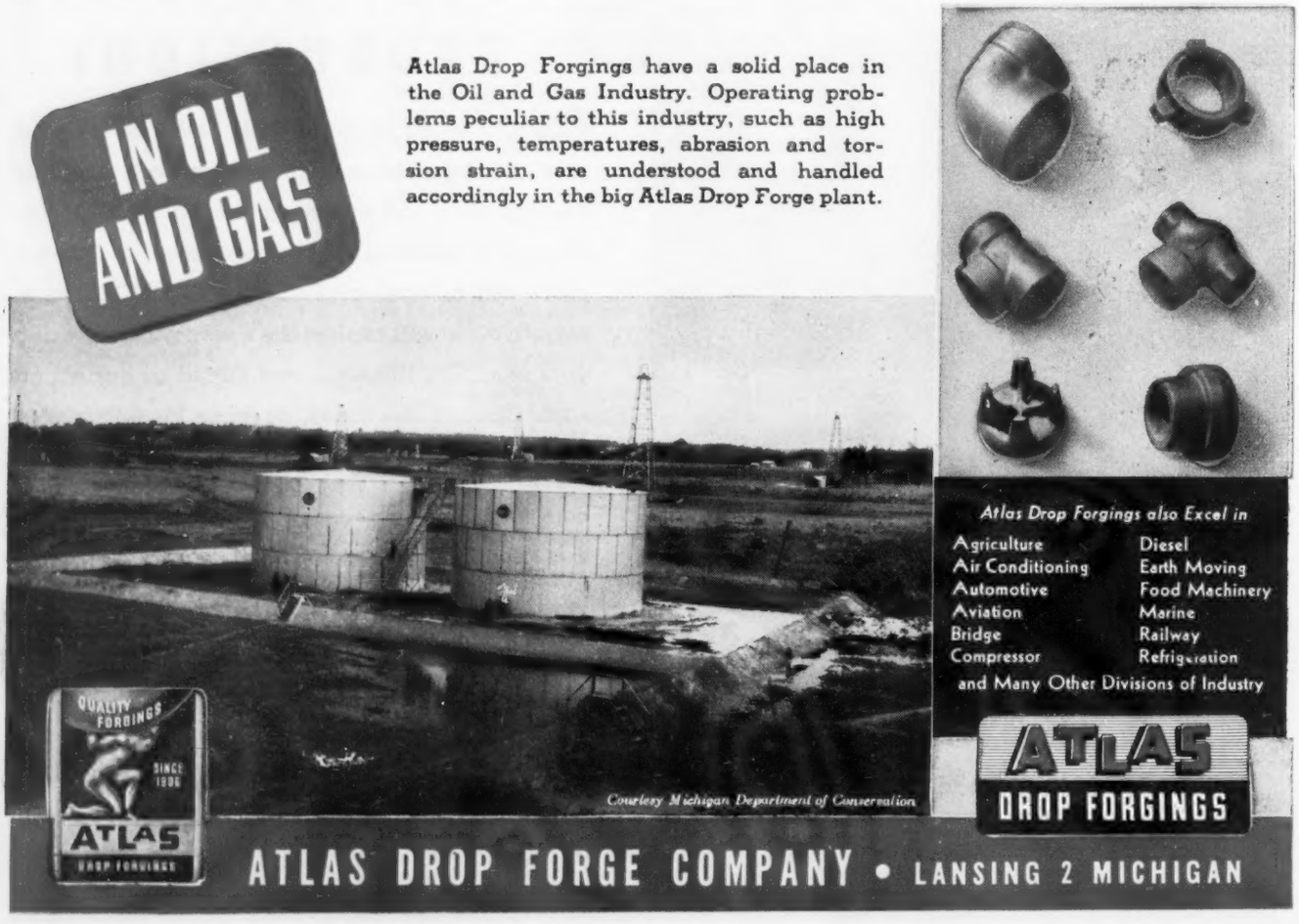
A patent has been issued for a newly designed piston, the head portion of which has two lug-like extensions which project into W-shaped pockets of the skirt portion and are held together by a wrist pin. Head and skirt are held in alignment by pins which fit into recesses in extensions and slot in bottom wall.

Granted by the patent office to William F. Morgan, Saginaw, Mich., under No. 2,296,478, it is stated that walls are of substantially the same thickness, avoiding stresses set up in the metal by an uneven heating and expansion. Spaces between head and skirt reduce contact of parts and transfer of excess heat received by head portion during operation of the engine, it is reported.

Freight Car Capacity Increased by New Method

Redesigning of crates and changing the arrangement of the tiers of crates in the freight cars has enabled the Apex Electrical Mfg. Co., Cleveland, to load an average of over 25 per cent more washing machines into each car.

Developed by the company's traffic department, the increase in capacity of the largest type car was from 156 to 210 washers per car. In a smaller car, the increase was from 96 to 126 units. A 60 per cent reduction of in-transit damage to washers was also reported.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Shop Practice

(*Continued from Page* 78)

less, very little cutter breakage has been experienced with this heavy cut.

The work is chucked on a 3-jaw universal. A tool in the square head cuts the length of the gearing. At the same time, a tool in the hexagon head faces the hub. The square head comes into action on the outside diameter of the gear while the hex head handles top and bottom bores. This square head operation finishes the outside diameter at 0.245-in. feed per revolution. The outside diameter of the drum gear is 26½-in. No chip breakers are used on the tools, which are made in the company's own tool room. Whether straight or negative rake, these cutters are operated at relatively low surface speed for carbide—metal removal depending on feed rather than speed.

After the finish turn from the square turret, the hexagon turret is used exclusively to finish the bores and for facing hub and rim. Cutting time on the total operation, involving the eight sequential steps, is 20 min. The shop machines 14 gears in 8 hours.

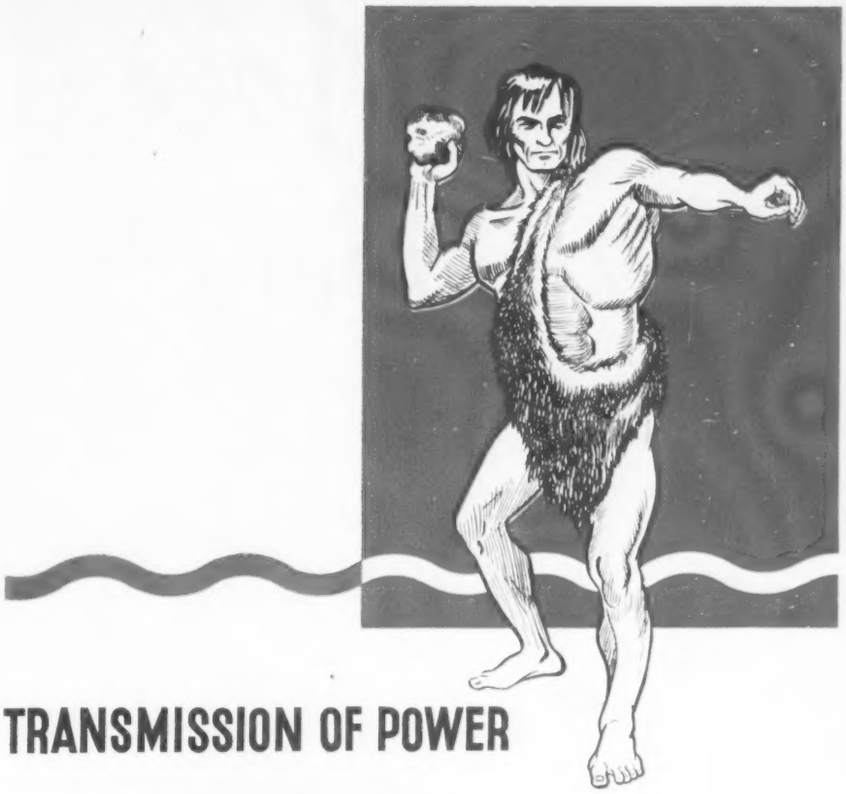
Work Drilled and Reamed

The work then proceeds to a Natco where it is gang-drilled and reamed, Fig. 2. The idea of having the drill and ream jig in parallel is somewhat unique. Large size 31/32 drills are used, and reamers are 1 in. in diameter.

Gears then pass to gear cutting department, Fig. 1. The main drum gear comes from the gang drill and is roughed and finished on a model 48 HS Gould & Eberhart gear hobber. They are run three on, using a standard hobbing machine and cutter set-up. Some of the cutters are 5-degree negative rake. The three-on operation requires bushing. Shop runs 0.050-in. thin on the roughing job, going down to depth and taking off the side. The pressure angle is 20 degrees and the hob diameter is 7-in. A ground hob is used for the finishing cut.

Both roughing and finishing are done on a No. 48 HS G&E. The gear diameter being machined is 22.266-in. with a 4⅜-in. face. Technical details involved in roughing are: Hob data—2½/3 P., 20 degree P.A., 7½ in. dia., 2 in. bore. Index gears are 72/60 x 25/81. Feed gears are 48/60 x 60/75 and speed gears are 37/57. Feed is 0.080-in. at 49 rpm to accomplish 90 fpm. The helix angle is marked on the hob.

Three pieces are loaded per cutting. Bushings on a 1⅞ arbor do the holding. Pin dimension, including back lash, is roughed to the depth on the hob. Production is six gears per 8 hours, which



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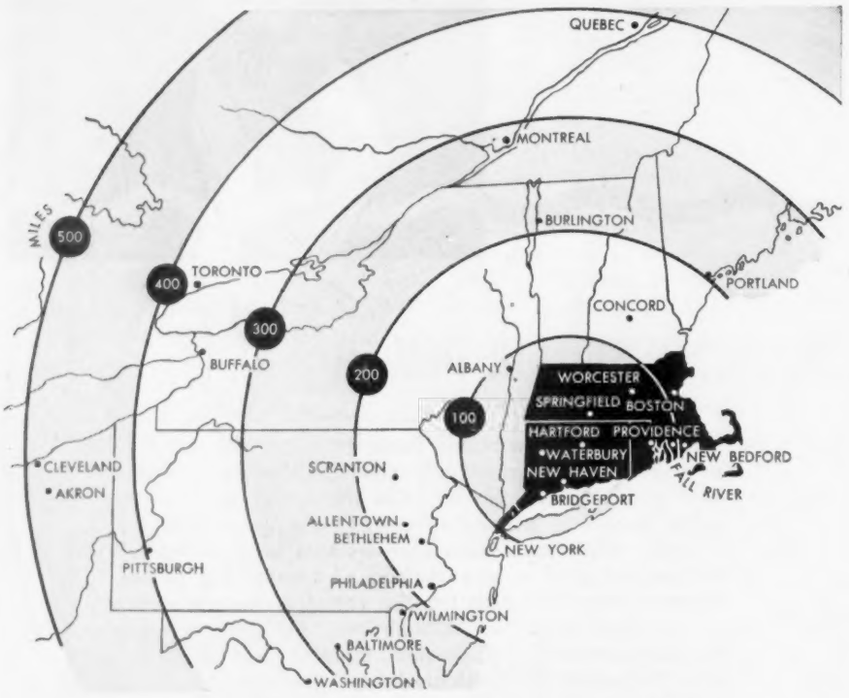

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is fast work for this type of gear cutting.

Finish gear cutting, Fig. 4, utilizes index gears 72/60 x 25/81, feed gears 72/60 x 60/90 and speed gears 41/53. A 0.100 feed is used at 58 rpm, accomplishing 110 fpm. Helix angle is marked on the hob. Load number is three as in roughing. The holding method is the same, bushings on a 1⅞ arbor. Pin dimension, including back lash, is finished to 22.552 over 0.691 pins. Production is 10 gears in 8 hours.

Hypoid Lubricants

(*Continued from Page* 85)

reaction of the chlorine compound with the high points on the gear surfaces which prevents metal to metal contact and subsequent welding.

Through a study of rates of reaction of chlorine compounds at several intermediate temperatures on iron powder,[5] it has been found that the principal reaction between the chlorine compound and iron occurs as follows:

I. $R\,Cl_x + Fe \longrightarrow FeCl_2 + R\,Cl_{x-2}$

and not:

II. $C_zHyCl_x \longrightarrow C_zH_{y-z}Cl_{x-2} + 2\,HCl$

$2\,HCl + Fe \longrightarrow FeCl_2 + H_2$

However, the temperature coefficient of reaction I is low, so in rapidly applied shock loadings, the rate of formation of ferrous chloride must be greatly accelerated to prevent welding.

This is accomplished by using a sulphur compound of controlled sulphur activity. These sulphur compounds start to react with iron at about 200°C and the rate of attack increases rapidly with temperature. Therefore, this sulphur compound forms a minute amount of iron sulphide on the high temperature surface points on the gear teeth. Reaction of the chlorine compound with such iron sulphur is very rapid and the sulphur is regenerated to continue the attack. Thus a film of $FeCl_2$ is rapidly formed by conjoint action of S and Cl compounds as follows:

First, $R_2S_2 + Fe \longrightarrow FeS + R_2S$

Second, $R\,Cl_x + FeS \longrightarrow R\,Cl_{-2} + FeCl_2 + S$

Third, $S + Fe \longrightarrow FeS$ (as above)

When sulphur and chlorine compounds are employed together to react on iron, the principal product is $FeCl_2$ with a minute amount of FeS_x, and these same products are found in minute quantities on the contact surfaces of heavily loaded hypoid gears—note Fig. 4.

High torque low speed lubrication means lower point temperature of lubrication than is involved in shock loadings, and a high degree of chemical reactivity is not too essential for this type of service. Gear lubrication through

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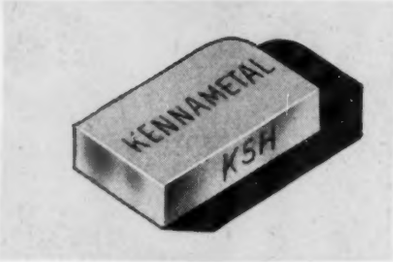
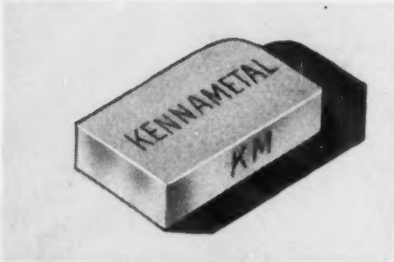
Most crater-resistant Kennametal tool material—gives outstanding service for finishing or moderate cuts on carbon and alloy steels .30% carbon and higher. Also time-and money-saver for general use on soft steels containing less than .30% carbon, precision boring of steel where .004" feed or over is used, and for many milling jobs on steel. 92 Rockwell A hardness.

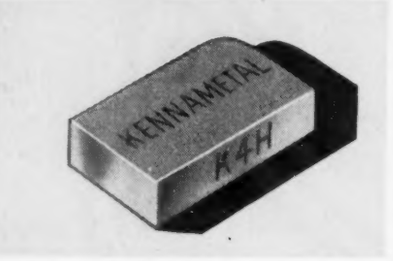


The hardest Kennametal tool material grade — specifically for solid tools used on precision boring of steel parts. Its high hardness, great resistance to cratering, and unusual strength can help you cut costs where fast, accurate work is essential. 93.2 Rockwell A hardness.

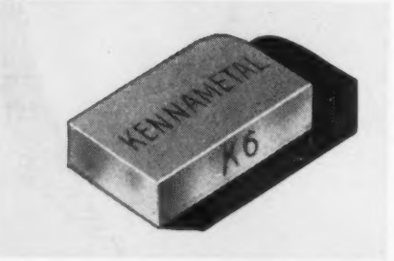


Strongest crater-resistant Kennametal tool material—saves tooling and production costs when taking rough cuts on carbon and alloy steel forgings, bar stock, etc., having carbon content of .30% and higher. Also outstanding for milling of steel at heavy chip loads. 91 Rockwell A hardness.

A very strong Kennametal tool material, particularly suitable for roughing cuts on steel castings. Its high resistance to abrasion and edge wear of sand inclusions makes possible exceptionally high rate production, and economical tooling costs. 91.5 Rockwell A hardness.



Highly resistant to edge wear—takes a good edge—a money-saving tool material for very light finishing cuts on steel and for precision boring with less than .004" feed. Ideally suited for tools requiring large nose radius or where tool must dwell without cutting. Excellent for milling, and very rough cutting of brass, bronze, and aluminum alloys. 92.3 Rockwell A hardness.



Reduces cost of machining cast iron. Extremely hard, straight tungsten carbide tool material having unusual strength. Holds keen edge, withstanding shock of interrupted cuts on rough, sandy, or chilled castings. Also outstanding for finishing and precision boring of cast iron. 92.2 Rockwell A hardness.

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chemical reaction and absorption presents many fundamental physico-chemical problems to be solved, of reaction rates, of selective adsorption of additives, temperatures and pressures reached, metal surface deformation, gear metallurgy, and metal surface contours. Eventually with the fundamental knowledge gained by solution of these problems greatly improved lubricants may be developed, but at present industrial developments appear to be considerably ahead of fundamental knowledge.

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Hot Water Supply Boiler Standard Circulated

Because the trade indicated a feeling that adoption of a generally acceptable, uniform method of testing and rating hand-fired hot water supply boilers would benefit all concerned, Bureau of Standards is now circulating for acceptance a recommended commercial standard. The standard, TS-4281, covers all sizes of hot water supply boilers. Rating is defined as maximum output in Btu's per hour and capacity in gallons of water heated 100° F in 3 hours. Copies are available from National Bureau of Standards, Department of Commerce.

Engine Regulating System Protects Against Overloads

A new power plant regulating system that protects the engine from harmful overloads yet permits maximum utilization of the engine's power was described recently by C. B. Lewis of General Electric Co., Schenectady, N. Y., at the winter convention of AIEE in New York.

System operates stably over a wide speed range and permits the use of the lowest possible engine speed commensurate with power requirements. The use of feedback from the electrical load allows the control to anticipate the speed changes which would be produced by changes in generator demand.

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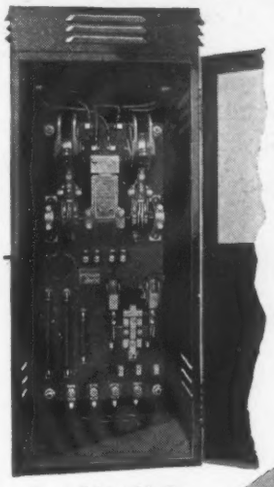

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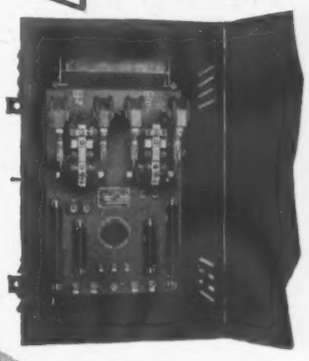

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These Magnet Controllers are supplied for use with all types and all makes of lifting magnets. They are designed to speed up lifting magnet operation by a quick, clean release of the load and to perform with minimum upkeep. All No. 1 Controller sizes use the EC&M LINE-ARC Magnetic Contactor for handling power to the magnet—a contactor without equal for interrupting highly inductive circuits in which contacts remain cool and have long life . . . and destructive burning of the arc shields is eliminated.

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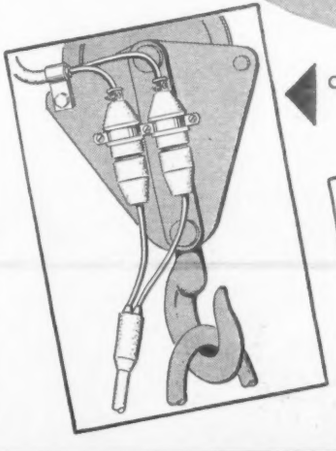

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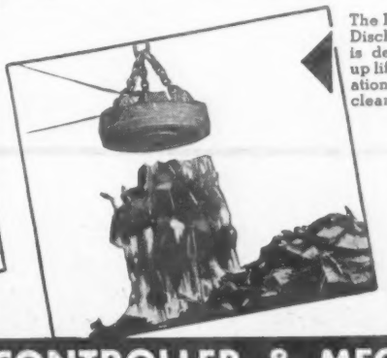

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Conditioning of ALABAMA IRON ORES

By A. A. NILSEN,
Ore Beneficiation Engineer and
ROY YINGLING
Superintendent
Ore Conditioning & Sintering Plant
Tennessee Coal, Iron & Railroad Co.
Birmingham, Ala.

Operations are synchronized in sequence so that ore from one mine is processed any time before final blending. Simple device facilitates starting up sintering machine. Pallet wear and breakage reduced by braking system. Impact damage to crushers avoided by rock boxes installed at various points

TO assure a dependable source of uniformly graded, uniform analysis ore for its blast furnaces at the Ensley and Fairfield plants near Birmingham, Tennessee Coal, Iron & Railroad Co. has installed a complete ore conditioning plant near Wenonah, capable of processing all the ore produced each month by the red ore mines which the company operates on Red Mountain. Ore was first put through the plant in November, 1940 and by January, 1941 the entire production of red ore was being conditioned, excess fines being stockpiled until the sinter plant was enlarged in August, 1941. Since then all fines have been sintered, together with much accumulated flue dust. Numerous modifications in equip-

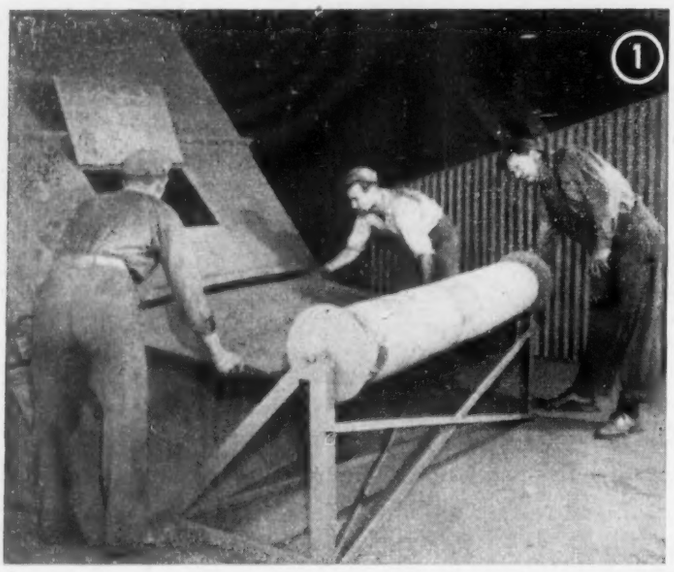

Fig. 1—Brattice cloth being inserted over empty hearth of sintering machine to preserve draft when starting

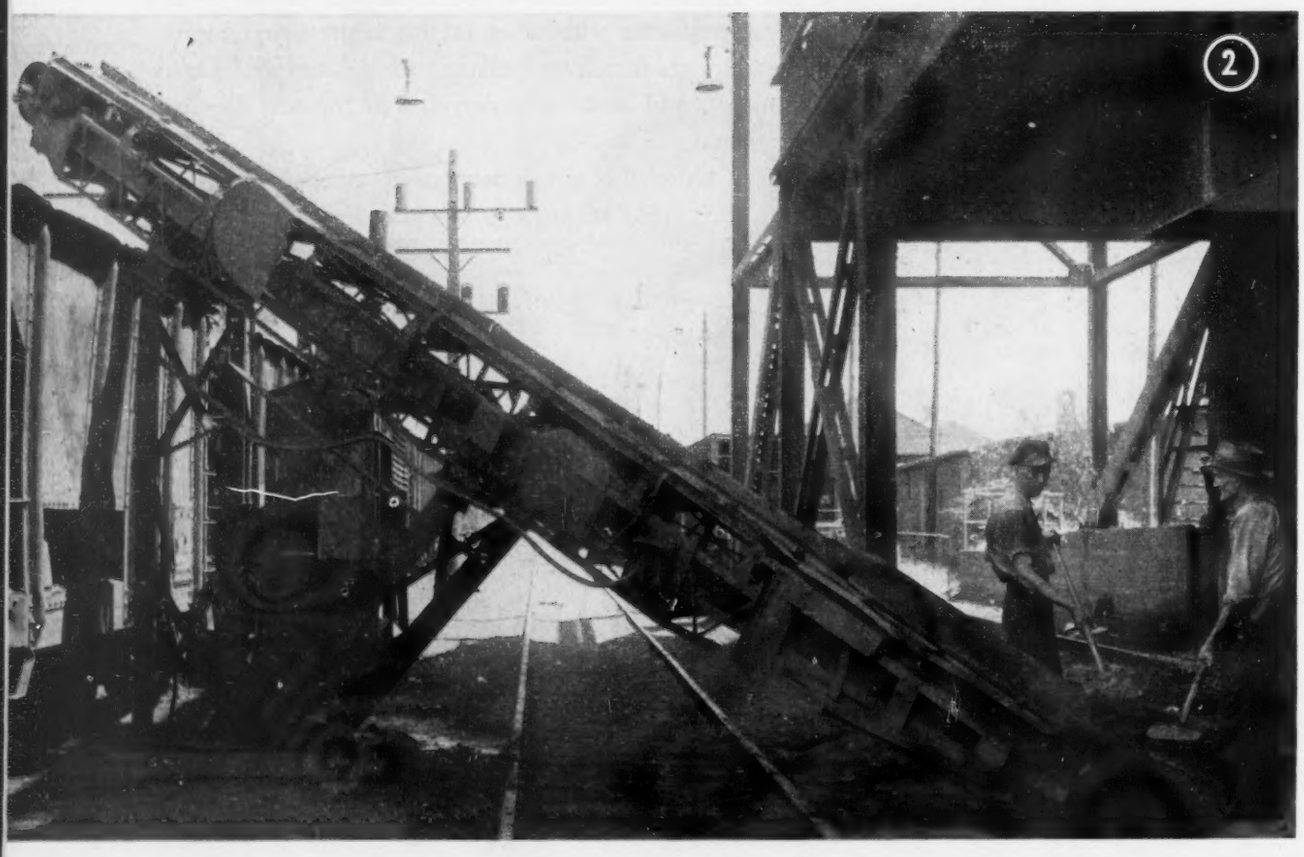

Fig. 2—Pivot-mounted cleanup loading conveyor at sinter discharge chute

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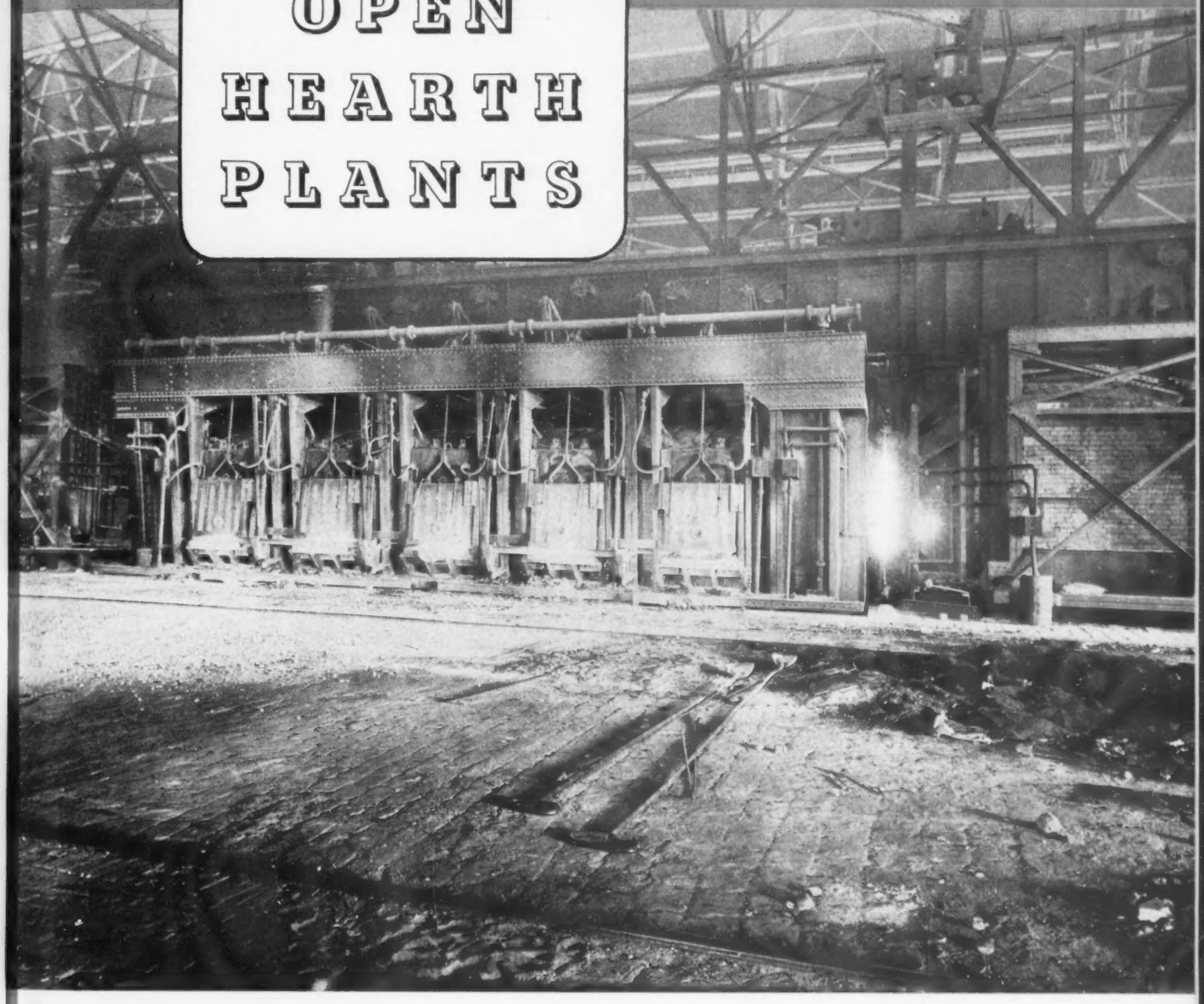
OPEN HEARTH PLANTS



RECENT McKEE ACTIVITIES have included work on open-hearth furnaces in both domestic and foreign locations. Contracts for these projects ranged from supervision of rebuilding to design, engineering and construction of complete plants ready for operation. The total annual production capacity of the twenty-five units involved is in excess of two million tons.

The same quality of engineering which has made the McKee organization the leader in blast-furnace design and construction is apparent in the superior design and efficient construction of McKee-built open-hearth plants.

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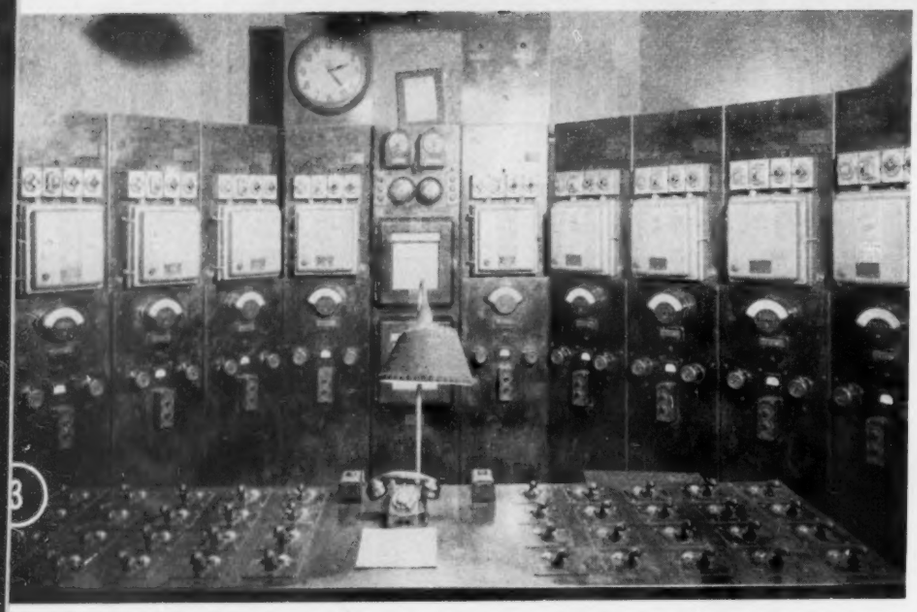


Fig. 3 — Silo control room—the nerve center of ore conditioning plant

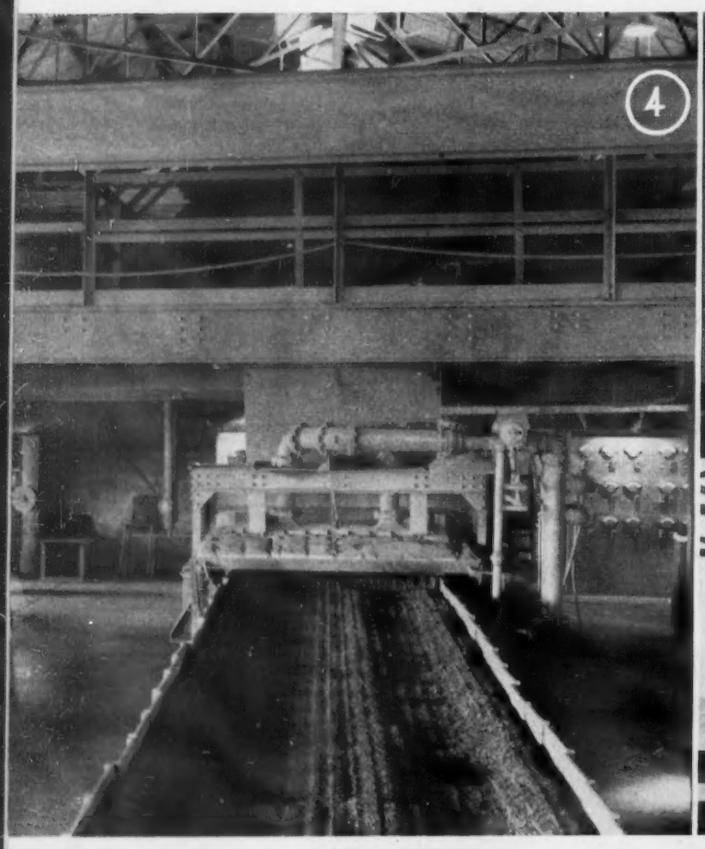
ment and operating practice have occurred since the plant went into operation, including the erection of additional silos, and most recently, provision for stockpiling blended ore during periods of low blast furnace operation.

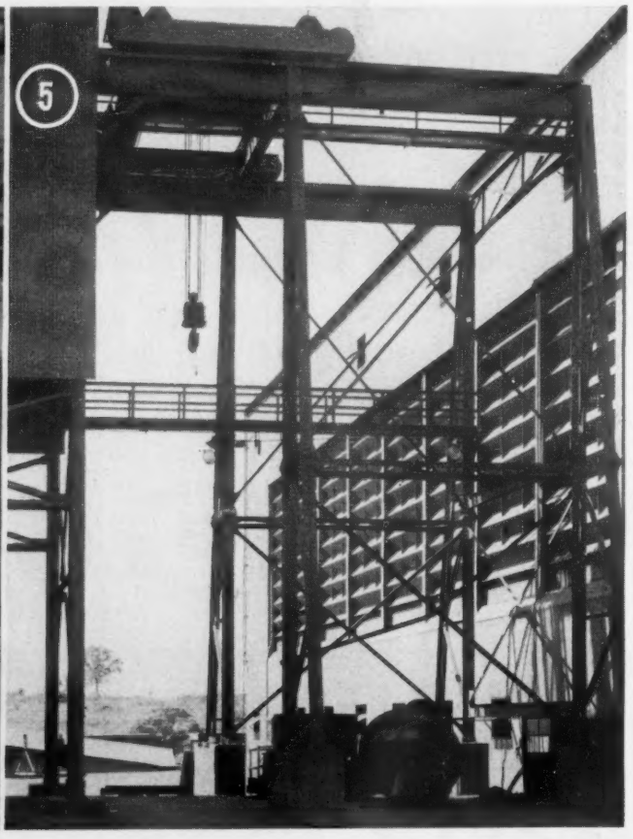
Raw ore from the various mines is brought to the conditioning plant over the company tracks in 70-ton railroad hopper cars, operations ordinarily being so scheduled that ore mined on the turn is processed through the conditioning plant the following turn. Fig. 7 shows the overall layout of the entire plant. Special precautions are exercised to avoid any mixing of ore as it comes from the mines, all operations being synchronized in a series of sequences so that only ore from one mine will be processed at any time prior to the final blending.

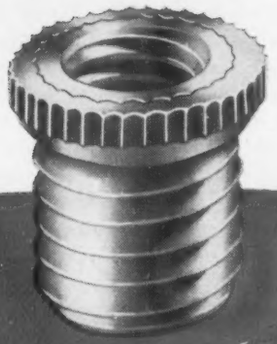
As shipments come to the plant from the various mines they are set out in a 5-track storage yard. From this yard the raw ore is taken to a rotary dumper capable of handling two 70-ton cars at a time. The operator is in constant touch with the silo control room and takes the raw ore in a sequence set up by the practice man and raw material foreman. Once dumping of a certain mine run of ore begins it is continued until the dump operator receives word that the last of that material has been stocked in the silos. When that cut of cars has been processed he signals ahead which mine run is next for dumping, but waits until he gets the all-clear signal before beginning operations. An elaborate sequence control board prevents the possibility of mixing ores during crushing and screening operations.

The rotary dump discharges through two gyratory crushers set for a 5-in. discharge. These deliver to a pair of 36-in. belt conveyors which take the raw product under an overhead magnet and over a magnetized head pulley to surge bins over secondary cone crushers which reduce the ore to a 1½-in. maximum with 75 per cent less than 1 in. size. Provision is made to screen out open-hearth charge ore from certain mine runs on a 4-in. vibrating screen installed over one

Fig. 4—Ignition end of one of three sintering machines
Fig. 5—Extended craneway and concrete apron at end of secondary crusher building







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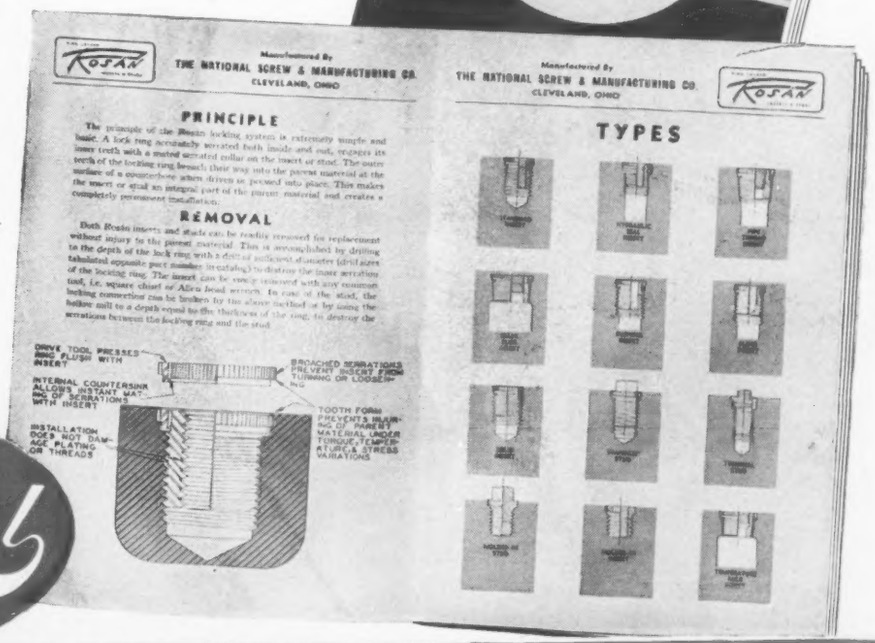
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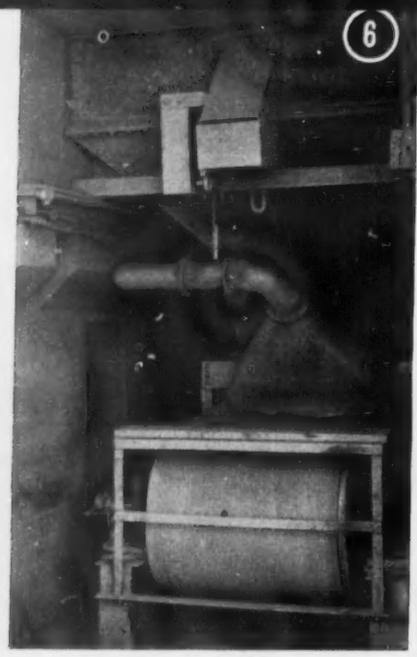


Fig. 6—"Rat trap" on chute discharging ore from secondary crusher building

of the secondary crushers, finer material going on through the regular processing. This heavy ore is by-passed on a series of belt conveyors into a hopper connected to a scale beam which is set to unload at 500 lb, discharging to a bin on the delivery track for loading into cars which take it direct to the furnaces. The number of dumps of the hopper is recorded at the rotary dump station.

Ore passing the secondary crushers is picked up on a 42-in. belt conveyor and taken to the screening building, running over a conveyor weighing station which registers by remote control at the silo control room. To prevent damage to the crushers, each delivery chute is equipped with an ingenious device developed by the mechanical and electrical maintenance department at the plant. These are called "rat traps" by the plant men, from their principle of operation. When material starts to back up in the chutes, either because of conveyor slippage or clogging of the chute, ore falls into a short 8 x 12-in. auxiliary chute opening on one side of the crusher chute, collecting in a trap with a counter balanced door swinging downward. An occasional piece of ore will not spring this trap door, but when an accumulation occurs, the door swings downward and opens the crusher circuit, at the same time sounding an alarm, stopping operation of the unit before serious clogging and damage can develop. Each of the four crushers is independently controlled. As soon as the plug has been removed or the conveyor trouble remedied, the door of the trap is returned to position and the circuit is restored. Fig. 6 shows one of these traps.

An extended craneway running out over a concrete apron adjacent to the secondary crusher building greatly facilitates repairs and storage of heavy pieces. Heavy trucks can drive up to receive parts which must be taken away for major repair or deliver new or repaired parts direct to the overhead crane for installation or stocking on the apron. (Fig. 5)

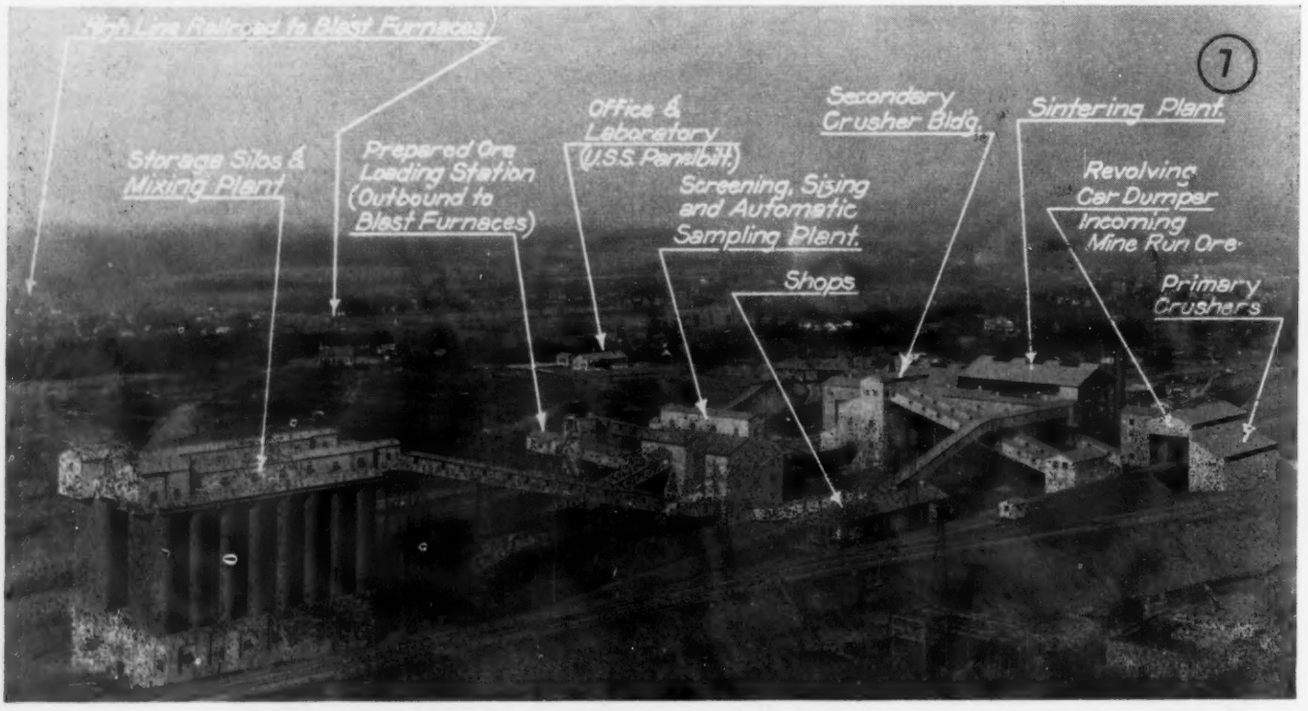
The operator of the secondary crushing plant is stationed on the upper floor so that he can see the level of the coarse ore in the four bins feeding his cone crushers. A series of red, green and white lights tells him the rate of feed on the belt under the crushers. White indicates a light feed, while green shows normal. When 1800 tons per hour is reached a warning horn sounds until the flow has been reduced below this level by means of the vibrating feeders which control the delivery of ore to the crushers.

In the screening building six double-deck vibrating screens separate the crushed ore into coarse, medium and fine sizes. Three belt conveyors take these fractions over continuous weigh stations to their designated storage silos or bins for blending. All weights are recorded at the silo control room. Automatic samplers, developed by the engineering department of the company, take a ½ of 1 per cent sample at all times from each of the three conveyors. Raw ore samples are delivered to the chemical laboratory for analysis after each mine run of ore.

As the ores from the several mines vary in acidity, care must be exercised to segregate the coarse and medium fractions. This is provided for by means of forty 800-ton steel silos. These are arranged in two banks of 20 each, the silos being grouped in clusters of four. Belts from the screening plant run over the tops of these silos and are discharged as desired by trippers set by the tripperman on instructions from the silo control room in accord with instructions from the practice man.

When all eight mines are operating, various tonnages of coarse and medium size ore will be delivered to eight sep-

Fig. 7—General view of central ore conditioning and sintering plant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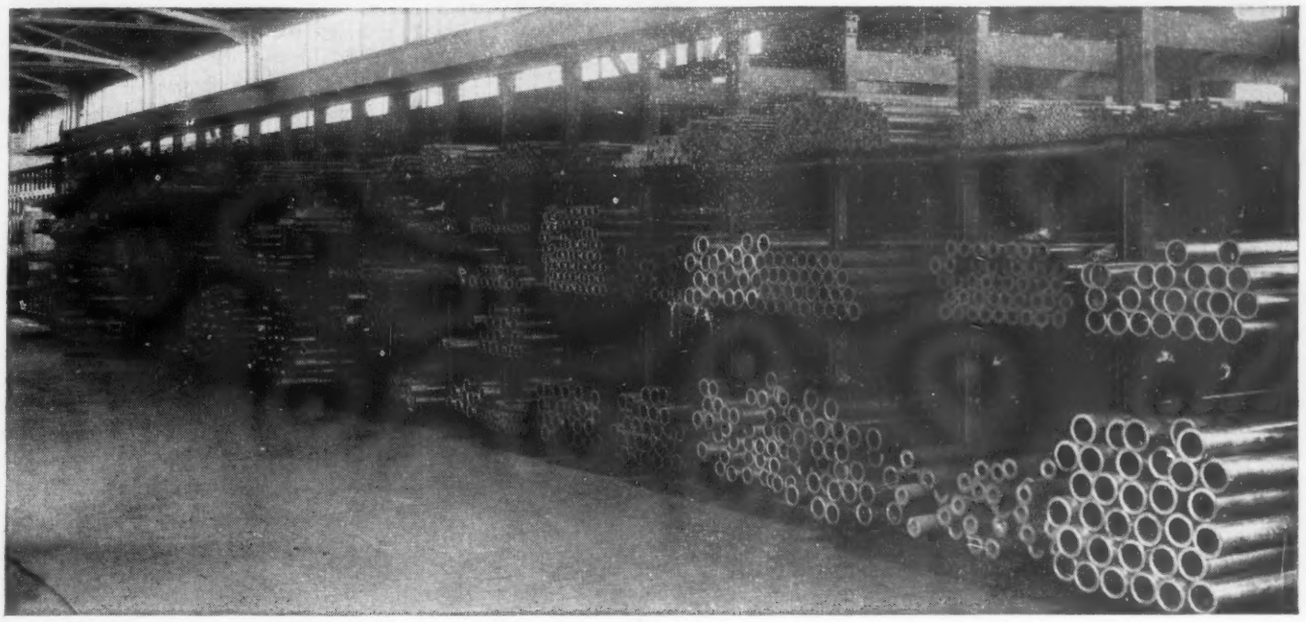

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Fig. 8—Discharge end of proportional feeder belts over blended ore collector belts at silo plant

arate silos in each of the two banks of silos as well as to eight fines storage bins. Ore is dumped only into empty silos or bins to assure accurate blending. One unit may thus be full and another hold only 50 or 100 tons either because it has been drawn upon in making a blend or because there was not enough incoming ore. The small tonnage will be cleared out, however, before ore is again stocked in that silo even though ore from the same mine is processed through the plant on the following shift.

Proportional belt feeders 60 in. wide are centrally located under each group of four silos, five feeders taking care of the coarse ore and another five being provided to handle the medium ore. The air-operated silo discharge gates are so arranged that only one silo in a cluster can be drawn on at a time, thus restricting blending to five silos at any one time.

The proportional feeders are designed to weigh out 250 lb of ore per lineal foot as the feeder belts pass the gates. By varying the belt speed the discharge rate may be adjusted between 0 and 10 tons per min. Fig. 8 shows a proportional feeder belt discharging to the main blend belt which takes the blended product to the car loading bin. A typical blending schedule as furnished by the practice man to the silo control room, is shown in the accompanying table.

The silo control room, which is the nerve center of the ore conditioning plant, is shown in Fig. 3. From this point the operator assembles blends of coarse and medium ores as scheduled by the practice man. Full instrumentation, as will be seen in the photograph, and electrical and pneumatic controls give the operator precise and prompt control over any of the proportional feeder belts. Signal lights and alarms automatically indicate whether any belt is running light or heavy and if the situation is not cleared up within a minute, the whole bank of silos affected is automatically shut down.

Equally close control is exercised in the sintering plant, which is thought to be the largest iron ore sintering plant in the United States and possibly the world. This plant adjoins the primary crushing building and is equipped with three modern sintering machines and three rows of bins for ore fines, flue dust and coke breeze or quenching pit fines from the coke operations. The first sintering machine has a hearth area of 72 in. by 80 ft 3 in. while the other two machines are 72 in. by 102 ft. No. 1 is rated at 50 net tons per hour and the other two at 60 tons per hour. Fig. 4 shows the ignition end of one of the sintering machines. Daily output of the sintering plant is approximately 4000 tons, requiring 3700 tons of ore fines and 1100 tons of flue dust and a small amount of coke breeze. Cold sinter weighs approximately 80 lb per cu ft.

Ore fines are brought to the sintering plant storage bins over a conveyor from the screening building and are segregated by mine runs in 17 bins, each having a capacity of 350 tons, in the same manner as are the coarse and medium ore fractions. Six bins are reserved for flue dust, which varies in carbon content from 12 to 22 per cent, and four bins each capable of handling 80 tons, for coke breeze which ordinarily is used for sintering over the weekend.

Sinter proportions are established by the practice man in much the same manner as are coarse and medium ore blends,

SILO BLENDING SCHEDULE

Blend	%	Group	Silo	Mine	Acid	Basic	Rate	Check	Analysis—Calculated blend, %	Analysis—Actual weighted, %
First	4.00	10	39	14	12.50		2.50	382	4.02	4.06
		8	15	10	10.25		2.50	381		
		6	10	9	8.50		2.50	382		
		4	8	6		1.00	4.15	625		
		2	3	4		2.50	4.15	624		
Second	5.00	9	35	14	13.00		3.10	262	4.99	5.01
		7	31	10	10.50		3.10	264		
		5	25	7	4.50		3.10	263		
		3	24	6		1.00	3.00	253		
		1	18	4		2.50	3.00	251		
Third	4.00	10	40	14	12.50		2.70	144	4.00	4.02
		8	16	11	8.00		2.70	145		
		6	11	7	3.00		2.70	146		
		4	5	6		1.00	6.20	329		
Fourth	5.00	7	30	11	8.00		4.65	335	5.00	5.00
		5	26	9	8.00		4.65	337		
		3	24	6		1.00	4.65	336		
Fifth	4.00	10	40	14	12.00		3.00	525	4.00	4.00
		8	15	10	9.00		3.00	523		
		4	6	6	1.00		3.00	526		
		2	1	4		2.50	4.60	805		
Sixth	5.00	7	30	11	8.40		5.00	491	5.00	4.99
		5	26	9	7.60		5.00	489		
		1	18	4		1.75	4.45	436		

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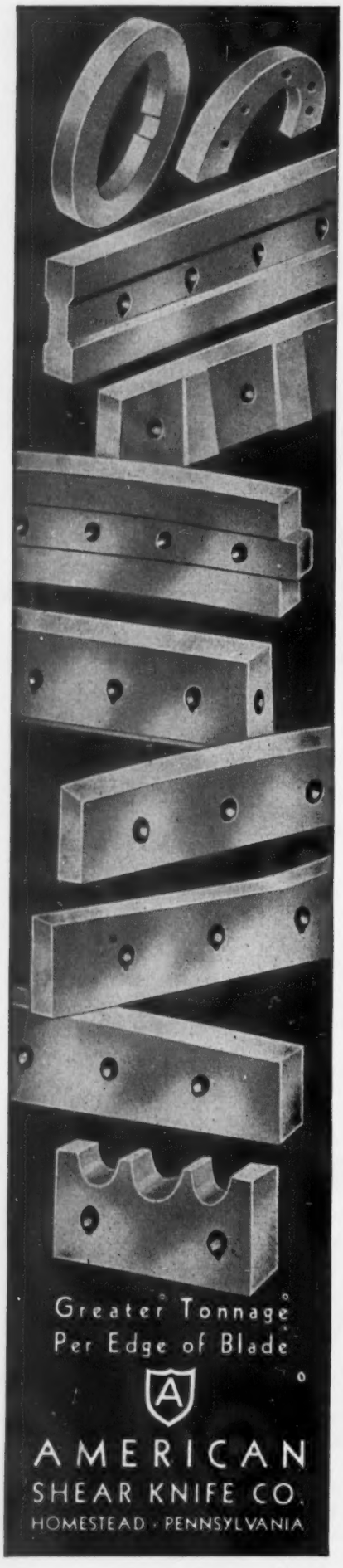

except that a sinter blend can be assembled from eight bins instead of five silos. Scale feeder belts under the sinter material blends can be adjusted to deliver from 3 to 50 tons per hour, discharging on a belt conveyor which also picks up the fine sinter returned from the screen at the sinter loading station. This sinter mix is delivered to a surge bin above the pug mills which prepare the mix for the sintering machines.

Considerable experimental work was involved in developing a feeder for the three pug mills which would maintain a uniform proportion of carbon, ore fines, and returned sinter. What is known as a "bread basket" resulted. This is a revolving mechanism which feeds all three pug mills in sequence and experience has shown that the mechanical assembly of the material on the belt, plus the pug mill grinding, gives a satisfactory and uniform blend. The sinter control board gives the operator control over every bin so that modification in the amount of carbon, (provided in the flue dust or coke breeze) can be effected promptly to cope with operating conditions.

All three sintering machines discharge to a common loading chute, where 14 water sprays play on the hot sinter as it moves over a 1¼-in. stationary grizzly on its way to the railroad cars which take it to the blast furnaces. In addition 42 sprays are provided to assure thorough quenching and a car ordinarily remains under these sprays for 40 min.

Several items developed in connection with the sinter machines are worthy of special attention. Feeding, for example, is one. A conveyor delivers the damp mix from the pug mill to a swinging spout immediately above the machine hopper. These hoppers are so designed that the incoming mix falls on a wear plate, then slides off to a feeder plate which deflects it to the advancing hearth with the proper segregation, i.e., fine material on top of the bed, increasing in coarseness until the coarsest lies on the grate bars. Hopper wear has been greatly reduced by this device and at the same time sintering operations have been made easier and the product more uniform.

Starting up a sinter machine is greatly facilitated by a simple device developed by the sinter plant staff. Instead of the usual paper covering of the hearth to preserve the draft, the Tennessee plant uses brattice cloth. Fig. 1 illustrates the operation. A roll of brattice cloth is provided at the discharge end of each machine and a narrow slot cut in the hood to permit the cloth to be pulled in over the bare hearth. After ignition of the sinter, this cloth is rolled up as the hearth advances, thus preserving the draft and eliminating the nuisance of the usual loose paper covering. Experience shows this method to be highly satisfactory.

Another device, independently developed at this plant, serves to reduce pallet wear and breakage caused by the drop at the discharge end when the pallets fall loose from the advancing hearth. All three machines at the Tennessee plant have a braking device consisting of a pair of curved rails about 8 ft long under rather heavy spring pressure. These bear on the under side of the pallet rollers as they return, about 20 ft ahead of the drive sprocket, and serve to keep the pallets closed up. As the pallets are pushed out from under this brake they separate smoothly and without jerking or vertical fall, thus holding link breakage to a minimum.

A pivot-mounted loading conveyor near the sinter loading chute is used for clean-up operations. (Fig. 2). With the aid of this loader, five men can clean up a week's sinter spillage around the car station in 5 hours. Prior to the installation of this loader, it took 12 men a full shift to do the same job.

Special precautions are taken throughout the entire plant to eliminate dust, both to improve working conditions and to protect the machinery. Exhaust hoods are installed at all dusty points and the fine dust from such points as the crushers, screens, conveyor heads and sintering plant collected in dry dust catchers. This material is ordinarily sold as a pigment or filler, much of it having been used in connection with practice bombs during the war. Excess dust can be added to the ore fines and sintered.

Telephone communication is essential in a plant of this type, particularly one so dependent upon close synchronization of sequence operations. The noise level is high in many locations, but this condition has been overcome by the installation of open, sound-proofed telephone booths in which an ordinary telephone conversation can be conducted without interference even in the noisiest locations.

Gas heating has replaced the old coke or wood-burning drums commonly used in mill or exposed working areas. These have demonstrated their value in reducing fire and personnel hazards. Similarly, electric water coolers, with salt tablets in convenient dispensers, aid in improving working conditions.

Excessive wear or impact-damage to crushers or belts is avoided by the installation of "rock boxes" at the crushers, screens, or wherever ore is transferred from one conveyor to another. These are usually made by bolting a series of angles to what would otherwise be the impact plate. The spaces fill with ore and this takes the heavy impact and abrasion which would otherwise soon destroy the plates or belts.

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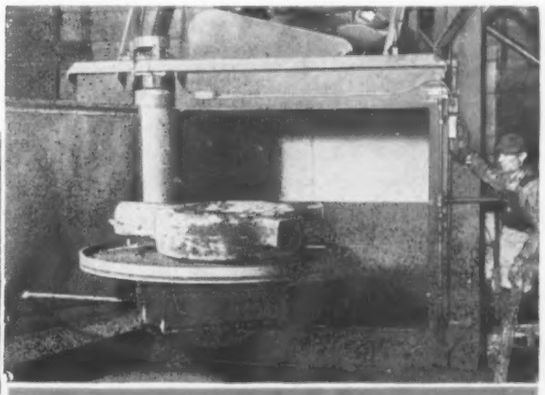

TYPICAL USERS

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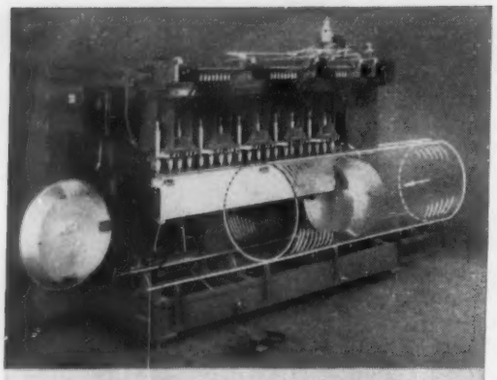
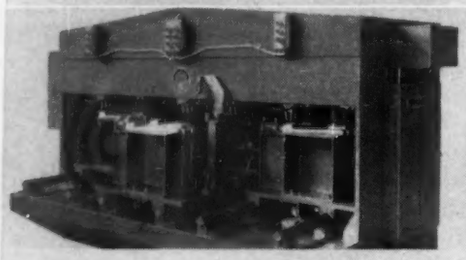
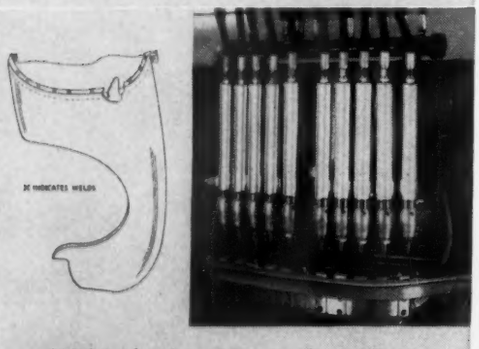
509 S. Byrkit St., Mishawaka, Indiana



Welds 3 sizes of shells for water heaters, from rolled sheet. Straight line production. 20 guns index automatically to make 40 welds. Five twin-secondary transformers. Automatic sizing (by cones); automatic clamping and unloading (left cone is air operated). Right cone and guns adjustable for different lengths.



This machine can bat out 300 steel drawers per hour in 3 sizes. Twelve welds per drawer. Three twin-secondary transformers. Automatic clamping and shuttling.



Welds fender skirts in front fenders with 10 simultaneous welds. Three twin-secondary transformers.

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Progressive multi-transformer machines are "tops" when it comes to extremely high production. This is due to:

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2. **Simplicity of design means low maintenance.**
3. **Flexibility. See examples at left.**
4. **High efficiency. Short cables. Number of simultaneous welds adjustable to power supply.**
5. **High salvage. Just change dies and relocate guns for a new job or different size part.**
6. **Avoids complete shut-down in case of trouble with any one transformer-gun group.**

Progressive's Process Engineering Department can help you obtain lowest overall cost per piece.

To Design Engineers—

In designing sheet metal parts for fast assembly on Progressive Multi-Transformer machines, remember to:

1. **Space welds at least 1¾" apart whenever possible to allow room for guns.**
2. **Where closer spacing is desired, locate welds in patterns (straight lines, curves, etc.) so that the guns can be automatically indexed singly or in groups to obtain required spacing.**
3. **To take full advantage of machine speed, design parts for quick loading. Where possible, provide for pre-loading of subassemblies.**

Progressive's Process Engineering Department will be glad to help you design for lowest overall cost per piece.

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RESISTANCE WELDING EQUIPMENT

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 124

1. Lifting Clamps

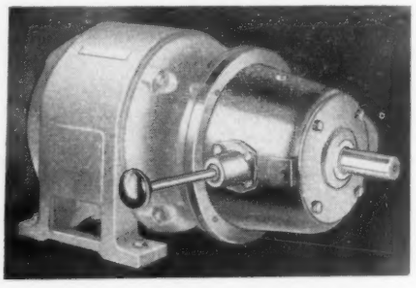
All parts are interchangeable in the four types of lifting clamps made by J. C. Renfroe & Sons, 1259 West State street, Jacksonville 1, Fla. Model E cam shackle vertical lifting clamp is designed so that crane operator can disengage clamp from work without assistance.

Safety lock model F clamp requires manual release from the work, as it locks

on the plate. Like model E, it is available in capacities of 1, 3, 5, 10 and 20 tons. Model P pipe clamp is designed with throat of sufficient depth to permit gripping cam to pass beyond the threads of the pipe. With a 2-ton capacity, maximum jaw opening is 1¼-in. The fourth style, a horizontal cam grip plate clamp, is used in one or more pairs when lifting and stacking plates in a horizontal position or when placing them under shears, punches, drill presses, etc. Capacities are 1, 5 and 10 tons.

2. Two-Speed Transmission

Two-speed motor transmission, announced by Western Mfg. Co., 3400 Scotten avenue, Detroit 10, provides a

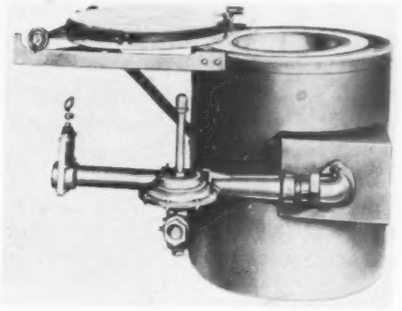


direct motor speed, neutral point, and any desired reduction up to 6.25 to 1, through an automotive-type gear shift lever. It makes possible standard reductions of 1½ to 1, 2 to 1, 3 to 1, 4 to 1.

Manufactured to apply on motor frames, No. 224, 225 and 254, the transmissions are mounted upon flanged-type end shield, and can be swiveled about on the face of the flange so that the shifting lever may be in any one of three different positions, 90 degrees apart. In larger sizes, transmissions are made with modified base mounting, corresponding with legs of motor frame.

3. Crucible Furnaces

Two new gas-fired crucible furnaces are being offered by Eclipse Fuel Engineering Co., Rockford, Ill.—an RB series for heavy foundry production in melting



brass, bronze, aluminum and other alloys, and an SB series for similar purposes, but incorporating an HE entrainment burner, that accurately maintains a constant air-gas ratio over an extremely wide turndown range. This permits a fast meltdown when required, with the ability to maintain a very low input, in case "holding" temperature is needed. It also has swingback cover.

Both types employ heavy sheet-steel shell construction and high quality refractory material linings.

4. Chip Breaker

Combination chip breaker and diamond finishing grinder which provides rapid chip breaker grinding on one side and precise diamond wheel finishing on the other is announced by Hammond Machinery Builders Inc., 1600 Douglas avenue, Kalamazoo 54, Mich. It handles all types of box and single point tools and accommodates all required angles.

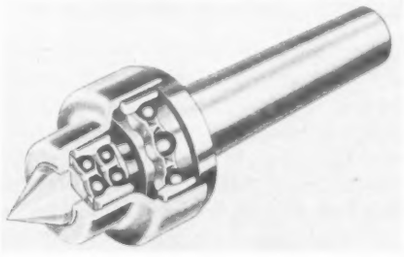
Chip breaker side of the machine (shown here) has vertical movement, with handwheel and dial calibrated to 0.001-in., traverse in and out from wheel with handwheel and dial calibrated to 0.001-in. and reciprocation underneath wheel with a lever operated table traveling on ball bearing ways. An any-angle vise provides all settings with four swivels, each graduated in degrees.

Cup wheel side of machine accommodates either a 6 or 7-in. diameter cup

wheel. Table tilts to any point between 25 degrees above to 30 degrees below horizontal. Table assembly is moved in and out from wheel by a feed screw. It has a compound protractor gage sliding in a slot parallel to the wheel. Cross slide is also provided for moving gage face toward the wheel.

5. Live Center

A live center with a replaceable alloy steel point ground true with the bearings is being introduced by Sturdimatic



Tool Co., 5216 Third avenue, Detroit 2. Characteristic of this design is a low overhang and a slight cushioning action that compensates for expansion due to heat, shock and excessive thrust loads, reducing wear to a minimum.

Large thrust bearing of the center takes

all thrust load, the large radial bearing taking only radial load. Brown & Sharpe, Jarno and other tapers may be supplied to specification.

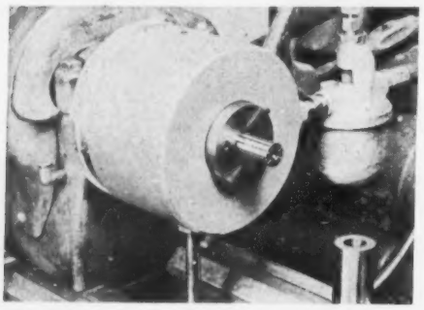
6. Rubber Tired Caster

An aluminum alloy rubber-tired caster in both rigid and swivel types is announced by Aerol Co., 1823 East Washington boulevard, Los Angeles. It embodies such features as shake-proof king pin, labyrinth dirt seal to protect lubricated bearings, extra offset for instant trailing.

Precision construction of wheel assembly and use of Timken tapered roller bearings on the race assure straight, even tracking and sensitive swivel action under heavy loads. Both thrust and king pin bearings are factory-greased.

7. Air Operated Mandrel

An air-operated mandrel, design of which permits mounting the work and holding it at the extreme front end of the sleeve only, is being manufactured by Erickson Tools Division of Erickson Steel



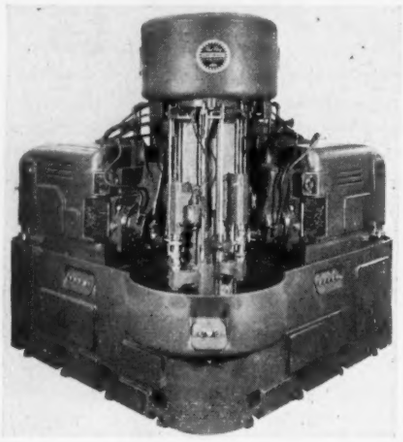
Co., 2309 Hamilton avenue, Cleveland 14. Alignment is not lost because it is insured by pressure created against back angle of sleeve. This principle suits the company's A9 mandrel to blind hole jobs. An accuracy of 0.0005-in. is guaranteed. It is available for operation with foot pedal control.

8. Gear Shaving Machine

Featuring two cutting stations and four work stations, Red Ring Turmatic shaving machine, built by National Broach & Machine Co., Detroit, incorporates the principle of crossed axes shaving. Its central 4-sided turret is equipped with four sets of head and tailstocks to carry work gears with their axes vertical.

Two cutter heads spaced 90 degrees apart automatically move the shaving cutters of the machine simultaneously into mesh with their respective work gears on adjacent turret faces. These cutters traverse across the work gear faces. After cutting cycle, cutter heads automatically back out of mesh and turret indexes 180 degrees to present two fresh gears to the cutters.

Automatic meshing of the cutter and work gear is made possible by a cutter locator and a nose piece which positions the gear teeth when loading. Nose piece also serves to reject oversize gears. Setting of the two cutter heads is mutually independent. In the case of cluster gears,



both cutters may be set to shave similar gears of the cluster simultaneously, or they may be set to shave two different gears.

Interlocks and safety devices prevent damage to cutters from oversize or improperly positioned work gears. Gears may be crown shaved on the machine and the amount of crown can be varied by cam adjustment.

9. Melting, Dipping Tank

Indirectly heated, thermostatically controlled melting tanks for use in heating, melting, dipping, and pouring critical compounds such as oils, battery, transformer, resistor and capacitor compounds

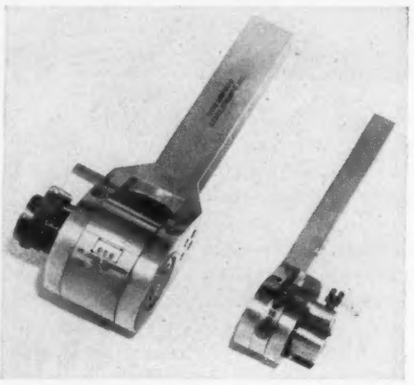
are announced by Aeroil Products Co., West New York, N. J. They are built on double boiler principle to insure uniformity of temperature on all four sides and bottom of the inner vat which holds the materials. Built-in thermostatic controls serve to hold temperature rigidly at any desired point from 100° to 550° F.

Both gas-fired and electrically heated tanks are made by the company. The former are heated from the inside by means of a patented immersion tube system said to save up to 50 per cent in time, labor and fuel. The latter are fabricated in both 40 gal size (equipped with heating elements of 13 kw total capacity) and smaller portable 15 gal units that can be wheeled where and when needed throughout the plant.

10. Automatic Roll Marker

Adaptable to lathes, shapers and automatic screw machines, a new automatic roll marker imprints letters, numbers, calibration lines, serrations, etc., on finish-machined metal parts. Developed by New Method Steel Stamps Inc., 147 Jos. Campau, Detroit 7. It may be used interchangeably for right or left hand operation.

With a changeover arrangement, the adjustable stop, stop-dog, and fully en-



closed automatic spring return of the marker can be shifted as an assembly from one side to the other to suit position in relation to spindle rotation. Marker also is equipped with a device for adjusting tension of automatic spring return for the roll.

Markers may be supplied with rolls of either solid or interchangeable type. Tools are standardized, shanks being designed for mounting in conventional holders, but are custom made to meet specific dimensional requirements.

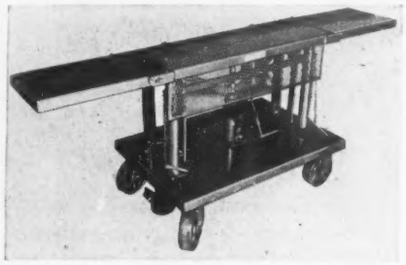
11. Air Pressure Regulator

A. Schrader's Son, Division of Scovill Mfg. Co. Inc., Brooklyn 17, announces a new air regulator adjustable to function in systems operating at pressures from 150 to 10 psi. With it, air to any working part used in conjunction with air cylinders, machine controls, etc., is delivered at the pressure for which the regulator is set (always less than lowest line pressure), saving wear and tear on the com-

pressor and reducing air costs. Device keeps the pressure at the equipment constant regardless of the sometimes wide variation in the system pressure.

12. Feed Table Conveyor

Made in capacity sizes ranging from 1 to 5 tons, a hydraulic feed table conveyor, made by Rack Engineering Co., 5102 Butler street, Pittsburgh 1, is capable of handling sheets from 3 to 10 ft



in length. Foot-operated, hydraulic operated mechanism permits operator to raise or lower load, and to control angle of table top through its range of 40 degrees. When tilted, top is secured by locking pins at both ends of the table.

Operator's hands are left free to transfer sheets from table top into die set. Equipped with 6-in. roller bearing casters, two of swivel type, table is easily maneuvered when loaded to capacity. Floor lock insures stability in working position. Guard screen protects operator in all positions.

13. Portable Rectifier

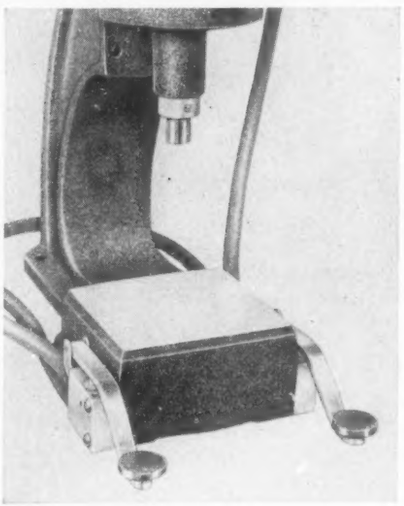
General Electric Co., Schenectady, N. Y., announces portable, sealed-ignitron, mercury-arc rectifiers for mining service. Equipment is a completely integrated, compact, alternating to direct current substation, mounted on mine-car-type wheels so that it can easily follow the load center as the working face moves away from the portal. Consisting of switchgear, transformer and rectifier cars, it is available in ratings from 75 to 750 kw, and gives added protection against mine dust and dirt, as well as increased safety for personnel.

14. Three-Way Air Valve

Suitable for mounting on either vertical or horizontal surfaces, the new three-way fingertip valve, manufactured by Mead Specialties Co., 4120 North Knox avenue, Chicago 41, has sufficient capacity to give fast action to cylinders with a bore of 4 in. Travel of button from full open to full closed is approximately ⅛-in. Illustrated are two model FT-1 valves, connected in series, which provide a means of preventing accidents in air press operations. Spacing far enough apart makes necessary operation with two hands, neither free to be left under the descending ram.

Because of its compact size and ease of adjustment, valve may be used to synchronize the action of a drill press, milling machine, etc. By means of a simple cam, an automatic cycle can be set up for many types of work. Valve is avail-

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 124.



able in four styles: Model FT-1, normally closed, actuates cylinder when button is pressed; model FT-2, normally open, actuates cylinder when button is released; model FC-1, same as FT-1, except lever and bracket are omitted for cam operation; model FC-2, also for cam operation.

15. Sequence Relay

A reversing, separate-circuit ratchet-operated type 96AFA multipole sequence relay is introduced by Struthers-Dunn Inc., 146-150 North 13th street, Philadelphia 7, is adaptable to numerous applications involving the addition and subtraction of loads, as in switching in or switching out individual units from a bank of capacitors.

In action, one of the two operating coils of the relay steps the cam shaft forward, a step at a time. The second steps the shaft in the reverse direction. Mechanical stops limit the forward and reverse travel of the shaft. Standard ratchets made by the company have 12 teeth. Thus a total of 12 contacts may be obtained in a sequence with no more than six separate contacts between each pair of bearing supports. Operating coils are for alternating current use only.

16. Resistance Thermometer

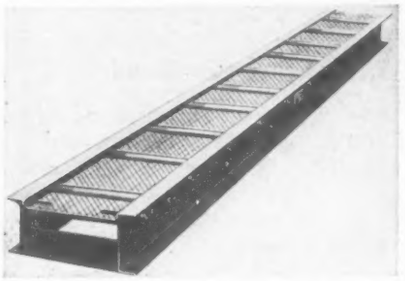
Temperatures as high as 1000° F are recorded by a newly developed industrial Thermohm resistance thermometer bulb reported by Leeds & Northrup Co., 4934 Stenton avenue, Philadelphia 44. Durably constructed, it is easy to install in ovens, tanks, ducts or pipe lines and features speedy response. Its own corrosion-resisting stainless tube gives ample protection for normal pressures and noncorrosive fluids.

Where required, the thermometer may be used with protecting wells. Its temperature coil is thoroughly protected against contamination by moisture or gases. It is being made in standard lengths of 6 and 12 in.

17. Roller Trackage

Heavy, hard to handle materials such as paperboard rolls, barrels, and bales may be transported on plant floors with ease on ballbearing roller trackage, developed by Engineering Products Co., 122 South Michigan avenue, Chicago 3.

Whole device is quickly installed. For installation, it requires a trench in the



floor only 6 in. deep and 14⅝-in. wide. Standard units are made 10 ft in length. Other lengths, curved trackage and turntables are also available.

18. Check Valve

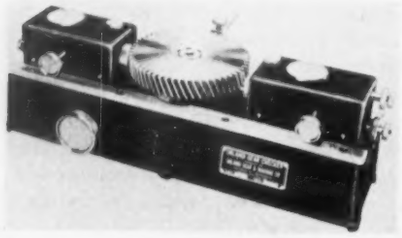
New check valve developed by Mansfield & Green, Cleveland, uses a simple double seal that completely eliminates leakage and loss of pressure even with grit in the system. Tests revealed that with grit 0.010-in. in diameter the valves show no leakage or seepage at any pressure to 10,000 psi.

The double seal principle utilizes a metal to metal seat plus a resilient rubber or synthetic rubber ring seal on the check valve poppet. Line pressure forces the resilient ring to the metal seat. The force in turn increases with increase of pressure, resulting in greater sealing force at higher pressures. Valve is available in

sizes ranging from ⅛ to 1 in. SPT, for pressures to 10,000 psi. It may be used with any media not destructive to rubber or synthetic rubber.

19. Gear Checker

Gear checking machine for production checking rapidly and accurately both spur and helical gears with pins and balls is announced by Orlandi Gear & Machine Co., 16205 Meyers road, Detroit 27. It enables the pitch diameter, concentricity,



size, tooth spacing, backlash and parallelism to be checked visually as fast as an operator can lift one gear and replace it on the anvil or locating pin with another.

Large and minute spur, helical and worm gears, plain and cluster, can be checked with high fidelity by inexperienced help. Machine can be converted for rapid 3-wire checking of any thread form. It also may be used as a comparator in checking precision parts.

20. Insert Chaser Head

Solid adjustable insert chaser die heads of 000 size and style SAMA, particularly applicable to small screw and tapping machines, are being manufactured by Eastern Machine Screw Corp., New Haven 6, Conn. High speed steel chasers are easily removable for regrinding and resharpening.

Die head is 1⅛-in. diameter and is 1 in. long. Capacity is up to ¼-in. and in pitches from 20 to 80. Chasers extend slightly beyond the face of the body for close to shoulder threading. Sizes in stock include these from No. 5 diameter to ¼-in. in national coarse and fine thread series, all right hand. Chasers in other forms are available on special order.

21. Shop Tractor

Buda Co., Harvey, Ill., announces an industrial model TR Chore Boy tractor for towing and speedy pick up and general hauling. Weighing about 1300 lb, it has drawbar pull of 1050 lb.

Over-all length of the tractor is 63¾-in., width 37½-in. Driver sits on a cushioned seat and has clear vision of any towing operation.

Truck features include two brakes, a foot brake and an automatic brake which is applied when driver leaves seat. Transmission is automotive type with three speeds forward and one reverse. The truck is powered by a 4-cycle, air-cooled engine located under the driver's seat. It also is equipped with a cone type clutch.

22. Power Auxiliary

The Hypot auxiliary, manufactured by Superior Electric Co., Bristol, Conn., is designed to operate as an intermediary between a 35-kv oil tester and a 115 v single phase source. Its components are

housed in a portable metal cabinet. Basic element of the unit is a Powerstat variable transformer driven by a synchronous, fast starting and stopping motor. Various switching arrangements, enables the auxiliary to be completely automatic or semiautomatic.

With completely automatic operation, voltage at the output terminals increases uniformly to maximum by pushing the starting button. Under semiautomatic operation voltage is increased or decreased in steps at a uniform rate by employing the "raise-lower" switch. Specifications of type S-803 auxiliary are: Input, 115 v, single phase, 60 cycles; output, 0 to 115 v, 210 kva; travel time, 11.5 sec, voltage increment 3 kv per sec when used with a 35 kv Hypot test set.

23. WELDING ELECTRODE

Direct current reverse polarity welding of low alloy cast steel or low alloy high tensile strength rolled steels in all positions is possible with the AP-MO electrode, developed by Westinghouse Electric Corp., Pittsburgh 30. Available in three diameters from ⅛ to $\frac{3}{16}$-in., it is designed for making butt and fillet welds. Welds meet requirements of AWS-ASTM tentative specifications of iron and steel arc welding electrodes classification E-7010.

24. SMOKE DETECTOR

An industrial smoke detector that detects fire in storage or record vaults is announced by C-O-Two Fire Equipment Co., Box 390, Newark 1, N. J. Using an enclosed light beam, it operates on principle of light reflected by smoke particles onto a photoelectric cell. Air samples are continuously drawn into a detecting chamber where, at the first sign of smoke, a red lamp is lighted and an alarm sounds.

25. CLAMP

Designed for use in any and all structures where wrap-around clamp action is required, a new clamp manufactured by Marman Products Co. Inc., Inglewood, Calif., consists of a snap-on interchangeable stainless steel strap, furnished in 1½ or 2 in. widths, a square swivel assembly and take-up and locking screws. Large diametrical take-up range is provided and pressure can be instantly released by backing off locking screw.

26. HAND GUARD

Worker production is increased by using a new handguard developed by Industrial Gloves Co., Danville, Ill. It leaves thumb and finger tips free for picking up material, yet provides complete protection. Flexibility is obtained by its open-back construction. Guard is of split cowhide steel stitched throughout. Sizes for men and women are offered in pairs, or for right or left hand only.

27. REFRACTORY CONCRETE

Kaocast, a concrete capable of withstanding temperatures as high as 3000° F is announced by Babcock & Wilcox Co., New York 6. It is a castable refractory suitable for the construction of industrial furnaces operating at these temperatures. Material has good stability and effectively resists spalling under repeated heating and cooling cycles. It can either be poured or used as a ramming mixture.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

49. Machine Tool Clutches

Carlyle Johnson Machine Co.—Illustrated installation and data book No. 47 describes Maxitorq floating disk clutch, automatic overload release clutch and ring type driving cups. Standard unit is available in sizes up to 15 horsepower at 100 revolutions per minute and overload clutch is available up to 5 horsepower. Engineering data, specification tables and diagrams are given.

50. Industrial Lift Truck

Hyster Co. — 16-page illustrated bulletin form No. 1058B describes Hyster 150 heavy duty industrial truck with 15,000-pound capacity. Unit will stack to height of 15½ feet at speed of 35 feet per minute. Features, dimensional data and specifications are given.

51. Alloy Steel

Joseph T. Ryerson & Son, Inc. — 24-page illustrated booklet entitled "Interpreting Hardenability" describes Jominy end-quench hardenability tests and how results of these tests are interpreted in form of other physical properties of alloy steel including tensile strength, yield point, elongation and reduction of area. Company's warehouse service is also covered.

52. Expanded Metal Meshes

Penn Metal Co.—8-page illustrated catalog No. 475-M describes standard and flattened Steelmesh expanded metal meshes; gives sizes, dimensions and weights; and covers applications.

53. Multiple Stage Pumps

Economy Pumps, Inc. — 6-page illustrated catalog No. B-1146 covers type CS vertically split case multi-stage pumps in capacities ranging from 50 to 200 gallons per minute. Design data, weight and outline dimension tables, details of construction and performance curves are included.

54. Induction Motors

Jack & Heintz Precision Industries Inc. —4-page illustrated bulletin presents type C2 single phase, capacitor start, constant speed, fractional horsepower induction motors. Design, construction, ratings, motor type numbers, frame sizes, applications and outline dimensional chart are covered.

55. Filter Elements

Briggs Filtration Co. — 4-page illustrated fileable folder No. SM 293-46 describes standard filter refills of absorptive felted cellulose, combination ceramic block and felted cellulose, and adsorptive ceramic block types. Features, advantages and methods of changing and assembling are covered

56. Continuous Cast Bronzes

Ampco Metal, Inc.—8-page illustrated bulletin No. 69 describes Ampcoloy continuous cast bronzes in rod and tube form. Tables of alloys and sizes available, physical properties, micro-photographs of leaded bronzes, typical specifications, table of rod weights and conversion factors for other alloys are included.

57. Suction & Water Hose

B. F. Goodrich Co. — Two illustrated catalog sections Nos. 4600 and 4800 provide information on suction hose for excavating and general utility services and various brands of industrial water hose, respectively. Suction hose section features description of Spiralock construction which provides smooth bore, light weight and easily bent hose. It is recommended for pressures up to 90 pounds per square inch.

58. Aluminum Castings

General Aluminum Mfg. Co. — 8-page illustrated reference book describes aluminum permanent mold and sand castings. Specification data, corresponding ASTM and SAE designations, heat treating recommendations, strengths, hardness information and properties are covered.

59. Milling Machines

Cincinnati Milling Machine Co.—12-page illustrated publication No. M-1507-1 presents details of No. 2ML plain and universal milling machines. Design features, applications dimensional data and specifications are given. Accessory equipment is described.

60. Industrial Elevating Truck

Automatic Transportation Co.—8-page illustrated bulletin presents data on Transtacker industrial elevating truck for moving, lifting and stacking loads up to 4000 pounds. Features, dimensional data, specifications and typical uses are shown.

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HELPFUL LITERATURE

61. Industrial Fire Hose

Hewitt Rubber Div., Hewitt-Robins, Inc. — 6-page illustrated folder covers general line of industrial fire hose. Products described include Monarch brand single and double jacket fire hose and Ajax brand mill hose.

62. Steam Cleaning Equipment

Hypressure Jenny Div., Homestead Valve Mfg. Co. — 2-page illustrated catalog sheet presents information on super capacity model JO Hypressure Jenny instantaneous steam cleaner. Features of design, specifications and applications are covered.

63. Industrial Lift Trucks

Elwell-Parker Electric Co. — 4-page illustrated folder form No. A-9451 presents details of type F-19 fork truck with electric or gas-electric power. Specifications, design and operating features and dimensional data are covered.

64. Precision Alloy Castings

Haynes Stellite Co. — 20-page illustrated brochure No. F-6244 describes Haynes precision castings for high strength, hardness, and resistance to wear, heat and corrosion. Metals include Haynes Stellite, Hastelloy and various stainless steels. Booklet covers specifications, advantages, procedures and other data.

65. Sling Chains

Columbus McKinnon Chain Corp. — 8-page illustrated booklet covers care, use and inspection of Herc-Alloy sling chains. Chart of load limits for both single and double types is included.

66. Grinding

Blanchard Machine Co.—80-page illustrated pocket-size handbook entitled "Work Done on the Blanchard", third edition, is cross-indexed booklet presenting data on work that can be accomplished on various Blanchard grinding machines. Typical set-ups and procedures are described.

67. Bronze Bearings

Johnson Bronze Co. — 80-page illustrated catalog No. 460 covers complete line of bronze bearings for all industrial services. Tables and lists of all standard electric motor bearings are given. Cored, solid and hexagon bronze bars and babbitt are described also.

68. Swiss Files

Grobet File Co. of America — 24-page illustrated tabloid catalog lists 3566 different patterns, sizes and cuts of hand and machine files and rifflers as well as rotary and deburring files and countersinks.

69. Renewable Fuses

Trico Fuse Mfg. Co. — 24-page illustrated vest-pocket size folder No. 260-A presents helpful information on use of renewable fuses in protecting expensive equipment and increasing production. Safety features are discussed.

70. Dust Control System

Tubulector Co. — 4-page illustrated folder "Modern Dust Control with Tubulector" describes three models of dust control systems having capacities ranging from 280 to 1050 cubic feet per minute. Typical installations are pictured.

71. Spreader Stoker Control

Bailey Meter Co.—4-page illustrated bulletin No. 1022 contains data on approved automatic control layouts for spreader stokers. Operation of standardized component parts of control system is covered, performance data listed and diagrammatic drawings included.

72. Drill Jig Bushings

Ex-Cell-O-Corp. — 8-page illustrated bulletin No. 11882-B contains prices and information on sizes of drill jig bushings under ASA standards.

73. Industrial Trucks

Clark Tructractor Div., Clark Equipment Co. — 36-page illustrated general catalog covers complete line of gasoline engine and electric motor powered materials handling trucks for all industrial requirements. Specifications are given and typical installations are shown. Yard-lift series of pneumatic-tired fork trucks is introduced.

74. Chamfering Machines

Cross Co. — 10-page illustrated booklet form No. 60 describes six types of Cross 60 series chamfering machines for pointing and chamfering spur, helical and bevel gears and splines. Complete specifications are included. Typical operations are illustrated and described.

75. Chain Belts

Chain Belt Co. — 12-page illustrated bulletin No. 46-10 presents line of Rex steel fabricated and cast chains. Installation photographs show applications in industry. Standard attachments and cast and cut tooth gears are also covered.

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Consumer Resistance to High Prices Seen in Scrap Break

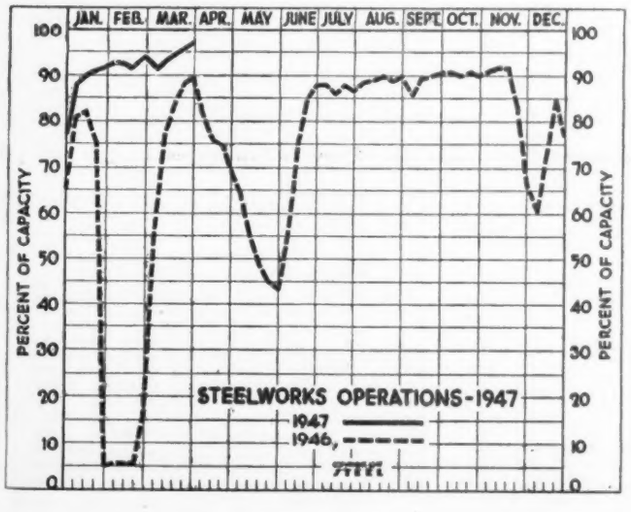
Long expected reaction thought heralding top of inflationary movement in iron and steel and related products. Midwest blizzard hampers steel shipments but ingot operations hit new postwar high

LONG expected reaction in the runaway iron and steel scrap market culminated last week in a definite price break of $1 to $2 per ton at various consuming points on local material and even higher on remote tonnage, strengthening recently voiced views the top of the inflationary movement in iron and steel and related markets has about been reached.

Coming after the downward adjustment in steel product extra charges by Carnegie-Illinois Steel Corp., which resulted in delivered price reductions ranging up to $10 per ton, and which action is being followed by other steel producers, the setback in scrap is seen heralding a change in market sentiment. As a matter of fact, market opinion increasingly leans to the view important cuts in steel prices are likely later in the year under pressure of competition with supply and demand in balance.

Consumer resistance to the current high prices is increasing. Steel buyers are vigorously protesting fantastic prices quoted on spot delivery steel in the so-called "gray" market. Concurrently, psychological pressure for downward price adjustments on commodities in general is being exerted by government authorities, including President Truman. In this connection the Federal Trade Commission is reported investigating alleged abuses in the marketing of steel products.

Further downward revisions are expected on scrap with many mills out of the market and purchases of material from remote points suddenly discontinued at some centers. Indications are, however, that so long as steel plant and foundry operations continue at the current high rates, and there is no indication of early decline, the reaction in scrap will be orderly.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended March 29	Change	Same Week 1946	Same Week 1945
Pittsburgh	101.5	+ 2.5	96.5	92
Chicago	96.5	+ 1.5	91	101.5
Eastern Pa.	90.5	+ 0.5	87	95
Youngstown	91	None	88	93
Wheeling	93.5	None	86	93.5
Cleveland	94	— 1	95.5	90
Buffalo	90.5	None	85	93
Birmingham	99	None	95	95
New England	94	None	94	90
Cincinnati	87	— 4	81	86
St. Louis	69	— 5	49.5	80
Detroit	90	None	88	95
Estimated national rate	97	+ 0.5	89.5	97

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Blizzard throughout the Midwest last week served to temper the weakness in scrap, slowing down shipments and thus providing a degree of resistance to the declining tendency. Resumption of active shipments and expanding collections should result in renewed pressure on the top-heavy price structure. Various factors contributed to the price break in scrap. The steel mills and foundries have been exhibiting increasing resistance to the high prices, and further, some stocks have been accumulated. Also, current heavy pig iron production has, in limited degree, eased the pressure on scrap. Pig iron output may establish a new all-time record within the next few weeks.

Demand for steel continues as pressing as ever. Flat-rolled products are under extreme pressure and no relief is in sight before late fall at the earliest.

Although steel shipments were hampered by blizzard conditions throughout the Midwest last week, steelmaking operations continued to climb, production only being hampered to minor degree by the storm. The national ingot rate advanced ½ point to 97 per cent of capacity, a new high since October, 1944. This represents the highest peacetime weekly tonnage in history, with output estimated at about 1,697,000 tons compared with the previous high of 1,650,500 tons in the week of Oct. 27, 1941. Present indications point to establishment of a peacetime record of about 7,500,000 tons in March. Operations advanced 2.5 points at Pittsburgh to 101.5 per cent, 1.5 points at Chicago to 96.5 and ½ point in eastern Pennsylvania to 90.5 per cent. The rate was off 4 points to 87 per cent at Cincinnati, 5 points to 69 per cent at St. Louis, and 1 point to 94 per cent at Cleveland. Elsewhere district rates held unchanged.

Reflecting the break in the scrap market, STEEL's price composite for scrap eased last week to $37.50 from $38. The composite on finished steel held unchanged at $69.82, as did that on semifinished steel at $52.10 and that on steelmaking pig iron at $32.49.

COMPOSITE MARKET AVERAGES

	Mar. 29	Mar. 22	Mar. 15	One Month Ago Feb., 1947	Three Months Ago Dec., 1946	One Year Ago Mar., 1946	Five Years Ago Mar., 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$64.75	$63.54	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	41.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	29.56	29.10	25.13	23.00
Steelmaking Scrap	37.50	38.00	37.92	32.73	27.69	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig IronComposite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel. net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	March 29, 1947	Feb., 1947	Dec., 1946	Mar., 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.55c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.91	2.82
Steel bars, Chicago	2.60	2.60	2.55	2.50
Shapes, Pittsburgh	2.50	2.50	2.35	2.35
Shapes, Philadelphia	2.64	2.64	2.48	2.465
Shapes, Chicago	2.50	2.50	2.35	2.35
Plates, Pittsburgh	2.65	2.65	2.50	2.50
Plates, Philadelphia	2.85	2.85	2.558	2.55
Plates, Chicago	2.65	2.65	2.50	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.48	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.19	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	†3.675	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.481	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.218	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	†3.675	†4.05
Hot-rolled strip, Pittsburgh	2.50	2.50	2.462	2.35
Cold-rolled strip, Pittsburgh	3.20	3.20	3.162	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.05	3.05
Wire nails, Pittsburgh	4.125	4.125	3.75	3.25
Tin plate, per base box, Pittsburgh	$5.75	$5.75	*$5.25	*$5.25

* Nominal. † Base changed in December to 10 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.	$38.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	39.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	39.00	39.00
Wire rods 7/32 to 1/4-inch, Pitts.	2.675c	2.675c	‡2.425c	‡2.30c

‡ Base, No. 5 to 9/32-in.

Pig Iron

	March 29, 1947	Feb., 1947	Dec., 1946	Mar., 1946
Bessemer, del. Pittsburgh	$34.83	$31.83	$31.77	$27.315
Basic, Valley	33.00	30.00	29.50	25.625
Basic, eastern del. Philadelphia	35.52	32.01	31.93	27.465
No. 2 fdry., del. Pgh. N. & S. sides	34.33	31.33	31.27	26.815
No. 2 fdry., del. Philadelphia	36.02	32.51	32.43	27.965
No. 2 foundry, Chicago	33.00	30.50	30.00	26.125
Southern No. 2 Birmingham	29.88	26.88	26.88	26.565
Southern No. 2, del. Cincinnati	34.75	31.75	30.94	27.965
Malleable, Valley	33.50	30.50	30.00	26.125
Malleable, Chicago	33.50	30.50	30.00	26.125
Charcoal, low phos., fob Lyles, Tenn.	40.50	37.50	37.50	37.340
Gray forge, del. McKees Rocks, Pa.	33.66	30.66	30.61	26.315
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.00	140.000

Scrap

Heavy melting steel, No. 1, Pittsburgh	$38.00	$33.75	$28.50	$20.00
Heavy melt. steel, No. 2, E. Pa.	38.50	33.25	27.38	18.75
Heavy melting steel, Chicago	36.00	31.25	27.19	18.75
Rails for rerolling, Chicago	41.50	38.50	31.00	22.25
No. 1 cast, Chicago	43.50	42.50	36.90	20.00

Coke

Connellsville, furnace ovens	$8.875	$8.875	$8.75	$7.50
Connellsville, foundry ovens	10.375	9.875	9.50	8.25
Chicago, by-product fdry., del.	16.10	16.10	15.288	13.75

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Buffalo, Bethlehem, Canton, Massillon, Coatesville, uncrop, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich., $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61; del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, lb 2.35c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 7/32 to 1/4-in., inclusive, $2.55-$2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base, del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c, San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: Price, 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-†6.70c; double refined, 7.00c-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c. (Andrews Steel Co., quotes on Middletown, O., base for shipment to Detroit area; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, not corrugated, copper alloy: Pittsburgh, Chicago, Gary, Birmingham, 4.15c; Granite City, 4.25c; copper iron 4.50c; pure iron, 4.50c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: 4.20c, Pittsburgh, Chicago, Gary; 4.30c, Kokomo, Ind. Armature: 4.50c, Pittsburgh, Chicago, Gary; 4.60c, Granite City, Ill., Kokomo, Ind. Electrical: 5.00c, Pittsburgh, Chicago, Gary; 5.10c, Granite City, Kokomo. Motor: 5.75c, Pittsburgh, Chicago, Gary; 5.85c, Granite City. Dynamo: 6.45c, Pittsburgh; 6.55c, Granite City. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $13.50; 15-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c. San Francisco and Los Angeles, del., 3.46-3.52c. (Central Iron & Steel Co., Harrisburg, Pa., 3.40c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont equivalent.)

Floor Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.

Clad Steel Plates: Coatesville, 10% cladding: nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; Geneva, Utah, 2.65c; New York, del., 2.70c; Phila., del., 2.64c. San Francisco and Los Angeles, del., 3.37c-3.41c.

(Phoenix Iron Co., Phoenixville, Pa., nominally, 3.75c, Bethlehem, Pa., equivalent.)

Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer .....*$3.30-$3.55
Spring (except Birmingham) **$4.25

Wire Products to Trade

Nails and Staples

Standard and cement-coated.....†$3.75-$4.50
Galvanized .....‡$3.75-$4.50

Wire, Merchant Quality

Annealed (6 to 8 base) ..... §$3.95
Galvanized (6 to 8 base) ..... §$4.40
(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier..... ††84
Barbed wire, 80-rod spool ..... ††94
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††82
Bale ties, single loop ..... ††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.

** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28, black premier.

† Worcester $4.05, Cleveland $3.85, base. San Francisco (base del.) $4.83.

‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

§ Worcester $4.05, annealed, $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.

†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails. Standard, over 60-lb. fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), $2.95, Williamsport, Pa.

Relaying, 60 lb and over, fob railroad and basing point, $46-$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

Steel In.	Blk.	Gal.	Iron In.	Blk.	Gal.
⅛	48	23	½	— 2	+20
¼ & ⅜	51	30½	⅝-1¼	—11½	+10
½	55½	41	1-1¼	—17	+ 2
¾	58½	45	1½	—22½	— 1½
1-3	60½	47½	2	—23	— 2

Lap Weld

Steel In	Blk.	Gal.	Iron In.	Blk.	Gal.
2	53	39½	1¼	— 1	+20
2½-3	56	42½	1½	— 7	+13
3½-6	58	44½	2	—14½	+ 5½
*8	58	42½	2½-3½	—17	+ 1½
*10	57½	42	4	—21	— 4
*12	56½	41	4½-8	—19	— 2½
			9-12	—10	+ 7

* Not T. & C.

Seamless Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.08	33.64
4"	10	35.82	42.55	34.78	41.68
4½"	9	47.48	56.42	....	....
5"	9	54.96	65.30	....	....
6"	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine

½-in. and smaller; up to 6 in. in length 55 off
⅝ and ⅝, up to 6 in. in length ..... 52 off
⅜ x 6 in. ..... 49 off
⅞ and 1 in. x 6 in. length ..... 51 off
1⅛ in. and larger in all lengths and ⅞ in. and larger in lengths over 6 in. ... 48 off
½ in. and smaller, longer than 6 in. .. 45 off
Tire bolts .....38½ off
Step bolts ..... 46 off
Plow bolts ..... 57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller.....	51 off	....
1-in. and smaller.....	....	48 off
½-in.-1-in.	48 off	....
⅛-in.-1-in.	....	47 off
1⅛-in.-1½-in.	46 off	45 off
1⅝-in. and larger	....	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright).... 56 off
Upset (10-35 heat treated)
⅝ x 6 ..... 51 off
¾, ⅞ & 1 x 6 ..... 47 off

Square Head Set Screws

Upset 1-in. and smaller ..... 61 off
Headless, ¼-in. and larger ..... 46 off
No. 10 and smaller ..... 56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural 5.25c
Lebanon, Pa. 5.40c
⅜-in and under .....55-5 off
Lebanon, Pa. .....55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl .....$1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
...	4	2	3	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plates	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310 ...	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A ..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	33.50
430....	21.00	24.00	31.50	19.00	24.50
430F...	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
*501...	9.00	13.00	17.50	13.00	18.50
*502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (30%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Pig Iron

Prices per gross ton. Minimum delivered prices to not include 3 per cent federal tax.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†Neville Island, Pa., base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., Del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	....	36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O., del.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

6.00-6.50 per cent (base) $40.50
6.51-7.00 ..$41.50 9.01- 9.50. 46.50
7.01-7.50 .. 42.50 9.51-10.00. 47.50
7.51-8.00 .. 43.50 10.01-10.50. 48.50
8.01-8.50 .. 44.50 10.51-11.00. 49.50
8.51-9.00 .. 45.50 11.01-11.50. 50.50

Fob Jackson, O., per gross ton, Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01-14.50%, $52.75, Jackson, O.; $56 Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.... $40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., Birdsboro, Pa., $39, base; Philadelphia, $41.16, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$8.75–$9.00
Connellsville, foundry	9.75–11.00
New River, foundry	11.75
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $9.35-$9.60.

By-Product Foundry

Kearney, N. J., ovens	$15.35
Chicago, outside del.	15.10
Chicago, del.	16.10
Terre Haute, del.	15.60
Milwaukee, ovens	15.85
New England, del.	17.25
Birmingham, del.	12.35
Indianapolis, ovens	14.50
Cincinnati, del.	15.39
Ironton, O., ovens	13.39
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	14.50

Coke By-Products

Spot, gal, freight allowed east of Omaha

Pure and 90% benzol	17.00c
Toluol, two degrees	22.00c
Industrial xylol	22.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "household use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$81.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	65.00
Ala., Ga.	65.00
N. J.	70.00

Intermediate Heat Duty

Ohio	57.00
Pa., Ill., Md., Mo., Ky.	59.00
Ala., Ga.	51.00
N. J.	62.00

Low Heat Duty

Pa., Md., Ohio	51.00

Malleable Bung Brick

All bases	75.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	42.00
Wire Cut	40.00

Silica Brick

Pennsylvania	65.00
Joliet, E. Chicago	74.00
Birmingham, Ala.	65.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.	
Bulk	24.00
Single bags	28.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	14.00

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos	Nom.
Swedish basic, 60 to 68%	13.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50–8.00

Tungsten Ore

Wolframite, per short ton unit, duty paid	$24–$25

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	3.85	3.75–3.85	...	...	...
Cold-Rolled	4.55–4.75	4.55–4.75	4.55–4.75	4.75	...	4.55–4.75	...	...	...
Galvanized	5.40	.....	.....	...	...	.....	...	...	...
Strip, Hot-Rolled	3.75–3.85	3.75–3.85	3.75–3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp Detroit.

WAREHOUSE STEEL PRICES

Base prices, cents per pound, for delivery within switching limits,* subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. °10G	Gal. °24G	†H-R	C-R	H-R	C-F	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
Boston (city)	4.50	....	5.22[4]	6.80[4]	6.80[4]	4.65	6.36	4.62	5.47	7.12	4.47	4.80	6.42
††New York (city)	4.42	....	5.27[8]	5.47[5]	....	4.62	....	4.62	5.42	8.42[13]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[8]	5.37[6]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.24	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.38	6.87	4.22	4.40	5.93
Philadelphia (country)	4.14	5.63[9]	5.23[9]	5.19[8]	6.44[8]	4.33	5.18	4.38	....	6.60	4.12	4.30	5.83
Baltimore (city)	4.09	6.15[5]	5.65[8]	5.14[8]	6.39[8]	4.40	....	4.45	5.35	....	4.34	4.39	5.90
Baltimore (country)	3.59	6.05[5]	5.55[8]	....	....	....	....	....	4.85	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Buffalo (city)	4.00	....	4.70[6]	4.35[5]	....	4.30	4.95	4.05	4.95	....	4.05	4.60	5.90
Buffalo (country)	3.90	....	4.60[6]	4.95[5]	....	3.90	4.60	3.95	4.85	6.60	3.95	4.20	5.45
Pittsburgh (city)	4.00	5.15[8]	4.70[8]	5.05[5]	6.30[5]	4.00	4.95	4.05	4.95	6.60	4.05	4.30	5.55
Pittsburgh (country)	3.90	5.05[8]	4.60[8]	4.95[5]	6.20[5]	3.90	4.85	3.95	4.85	6.60	3.95	4.20	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	5.12[13]	7.01	4.42	4.59	5.92
Cleveland (city)	4.00	5.15[8]	4.70[8]	5.238[5]	6.488[5]	4.00	5.05	4.05	4.95	6.858	4.311	4.30	5.811
Cleveland (country)	3.90	5.05[8]	4.60[8]	....	....	3.90	4.95	3.95	4.85	....	....	4.20	....
Cincinnati	4.116	5.266[8]	....	5.166[5]	....	4.394	....	4.403	5.303	....	4.444	4.653	5.944
Chicago (city)	4.00	5.15[8]	4.70[8]	5.05[5]	6.30[5]	4.00	5.05	4.05	4.95	6.60	4.05	4.30	5.70
Chicago (country)	3.90	5.05[8]	4.60[8]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.85	6.60	3.95	4.20	5.60
Milwaukee	4.199	5.349[8]	4.899[8]	5.249[5]	6.499[5]	4.199	5.249	4.249	5.149	6.899	4.249	4.499	5.899
St. Paul	4.384[1]	5.534[8]	5.084[8]	5.434[5]	6.684[5]	4.404[13]	....	4.434[13]	5.726[11]	7.084[11]	4.434[13]	4.684[13]	6.084[13]
Indianapolis	4.04	....	4.84[8]	5.29[5]	6.54[5]	4.24	....	4.36‡‡	5.26	....	4.36	4.61	6.01
St. Louis	4.199	....	4.899[8]	....	6.674[5]	4.199	....	4.249	5.324[13]	7.074	3.999	3.999	5.999
Birmingham (city)	3.85[20]	....	....	5.20[5]	....	4.10[20]	....	4.05[20]	5.83	....	4.05	4.30	6.56
Birmingham (country)	3.75[20]	....	....	5.20[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.46°°	....	5.77[8]	....	....	4.83[20]	....	4.78°°	6.14[11]	....	4.68°°	4.83[20]	6.94[20]
Houston, Tex.	4.50[1]	....	....	....	6.00[12]	5.80[1]	....	°°°	....	....	....	5.60	6.40
Omaha, Nebr.	4.868	6.118[8]	....	5.918[5]	7.168[5]	4.862	....	4.918	5.81[8][11]	....	4.918	5.168	6.568
Los Angeles	5.55	....	7.10[8]	....	8.10[5]	5.65	8.35	5.10	6.90[19]	7.85	5.20	5.20	7.20
San Francisco	4.90§§	....	6.30[5]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	°°°	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Tacoma, Wash.	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]
Seattle	....	....	....	7.30[5]	....	5.20[17]	....	4.90[17]	6.75[19]	8.95[19]	4.95[17]	5.25[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 to 39,999 pounds; cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 49,999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]1500 to 39,999; [20]—400 to 3999 pounds.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ basing point cities with quotations representing mill prices plus warehouse spread; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; °° add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; °°° rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco; bar size angles, flats, rounds 5.00c, squares and half ovals 5.15c and bar size channels 5.55c at Houston.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., Pittsburgh, $44.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.70c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, carlots, bulk 6.40c, packed 6.90c, ton lots 7.30c, smaller lots 7.70c, eastern, freight allowed; 6.65c, 7.15c, 7.90c and 8.30c, central; 7.20c, 7.70c, 9.80c and 10.20c, western; spot up 0.25c; notched up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.10; contract, $1.98; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Ferrovanadium: V .35-.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.95c, ton lots 13.45c, smaller lots 13.95c; 80-90% c.l. 11.35c, ton lots 11.90c, smaller lots 12.45c; 75%, c.l. 10.15c, ton lots 10.75c, smaller lots 11.35c; 50% c.l. 8.45c, ton lots 9.10c, smaller lots 9.75c. Deduct 1.0c for bulk carlots 75%, 80-90%, 90-95%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots.

High carbon, high nitrogen, add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c; add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 20.00c, packed 20.15c; ton lots 21.00c, smaller lots 22.00c, eastern, freight allowed, per pound contained Cr; 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c western; spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched, 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb to c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15.50c, ton lots 16.50c, smaller lots 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35% , Si

60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, smaller lots 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 13.65c; 2000 lb to c.l., 15.05c; central zone, 14.25c and 17.30c; western, 14.85c and 19.05c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 13.15c, 2000 lb to c.l. 14.65c; central, 13.85c and 16.90c; western, 14.45c and 18.65c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese, containing exactly 2 lb Mn and about ½ lb Si eastern zone, bulk, c.l. 6.15c, ton lots 7.05c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Ferrosilicon: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.20c, ton lots 4.60c, smaller lots 5c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.35c, ton lots 4.75c, less 5.15c; notched, 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max, Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Prices per lb of alloy, contract, carlots 12.50c, ton lots 13.25c, smaller lots 14.00c, eastern zone, freight allowed; 12.80c, 14.35c and 15.10c, central; 12.80c, 16.30c and 17.05c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract or spot, carlots, bulk 12.00c, packed 12.75c; ton lots 13.50c, smaller lots 14.25c, eastern zone, freight allowed; 12.30c, 13.05c, 14.60c, 15.35c, central; 12.30c, 13.05c, 16.65c, 17.30c, western.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) Prices per lb of alloy, contract or spot, carlots, bulk 11.75c, packed 12.50c, ton lots 13.25c, smaller lots 14.00c, eastern, freight allowed; 12.05c, 12.80c, 16.30c, 17.05c, western.

Zirconium Alloy: 12-15%, per lb of alloy, eastern, contract, carlots, bulk 4.85c, packed 5.30c, ton lots 5.65c, smaller lots 6.00c; spot up 0.25c.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.50c, ton lots 15.75c, smaller lots 17.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $2.80, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Metal Prices Hold Steady

RFC reports on stockpiles of metals . . . Signs agreement with Bolivia for tin at 76.00c, fob South American parts

NEW YORK — With prices on major nonferrous metals steady, chief interest centered last week in developments which will have an ultimate effect on supplies. These include deliberations in Congress regarding the 4-cent import duty on copper, RFC's report on its holdings of that metal and on that agency's agreement with Bolivian tin producers.

COPPER — No action has been taken as yet on the proposed bill which would suspend the 4-cent import tax. Upstate New York manufacturers whose operations have been curtailed recently by the shortage of copper have appealed to their congressmen for elimination of the duty. The stockpile of copper held by the Office of Metals Reserve dropped about 18,500 tons during February to only 38,622 tons. This reserve which has been drawn upon heavily to meet urgent needs will soon be exhausted, making it necessary for consumers to look to foreign markets to augment supplies. A moderate tonnage of foreign copper was sold last week on export account at 22.75c, fas New York. The domestic market held steady at 21.50c, Connecticut, for electrolytic copper.

Although consumers are badly in need of copper, only a moderate volume of inquiry is being received at sellers' offices since tonnages generally are being alloted to regular customers. Consumption of copper by the brass mill fabricators in February amounted to about 115,300 tons, according to statistics released to the trade recently. This represents a drop of about 24,000 tons from January, due in part to the shorter month. Copper suppliers had shipped to consumers during that period 117,734 tons of which 79,626 tons were domestic copper and 38,108 tons foreign copper, the latter shipped to consumers by the Office of Metals Reserve.

TIN—Recent Argentine-Bolivian trade treaty under which Argentina will get Bolivian concentrates in 1947 containing 8000 long tons of fine tin will reduce our Bolivian receipts this year. The Reconstruction Finance Corp. and the Bolivian tin producers have reached an agreement on a 1947 contract at an average price of 76.00c per pound of tin contained, fob South American ports. This is an increase of 9 cents a pound over the present contract price. Under this agreement, this country will receive Bolivian concentrates in 1947 containing an estimated 10,000 to 12,000 long tons of fine tin compared with about 19,000 tons in 1946. The agreement covers virtually all Bolivian tin production, except that part reserved for Argentina. The contract with RFC will run from Apr. 1 to Dec. 31 of this year but will cover production of tin concentrates retroactive to Jan. 1 of this year. Average grade of the ore must equal the 1946 average; in other words, it must contain approximately 40 per cent tin. Spot tin held last week at 70.00c, New York.

LEAD — Daily production of lead increased about 100 tons in February from the January rate, although total production from primary and secondary sources showed a decline to 43,077 tons compared with 44,422 tons due to the shorter month. Production of primary metal in February totaled 41,210 tons, off 1296 tons from the preceding month while that from secondary materials was 1867 tons, off 40 tons.

Shipments to consumers increased to 48,398 tons in February from 44,343 tons in January. This was the largest total recorded since December, 1944, when 50,420 tons were shipped. Stocks of refined lead at refineries at the end of February declined to 42,835 tons from 48,164 tons reported on Jan. 31. Production of antimonial lead increased sharply in February to 10,491 tons from 7993 tons in the preceding month. Government stocks of refined lead on Feb. 1 totaled only 33,678 tons compared with 36,124 tons on Jan. 1 and 53,182 tons a year ago. These stocks consist of primary lead from foreign sources, chiefly of corroding grade.

Consumers' requirements for April are covered to the extent of nearly 60 per cent. Prices were steady last week at 14.80c to 14.85c, East St. Louis, for the common grade.

ZINC—RFC's stockpile of zinc, held by OMR on Feb. 28, amounted to 446,616 tons of refined metal and zinc contained in concentrates. This compared with 473,176 tons as of Jan. 31. Canada exported 20,398 tons of refined zinc in January, of which the United States received 6100 tons. The domestic market was quiet last week with prime western unchanged at 10.50c, East St. Louis.

ANTIMONY—RFC's stockpile of antimony totaled 4989 tons, including refined metal and metal in ore, on Feb. 28, a gain of 650 tons during the month. The domestic market held unchanged last week at 33.00c, fob Laredo, Tex., in bulk.

SILVER—Prices quoted on the open market fluctuated widely here last week with sales reported from a high of 77.50c to a low of 73.25c compared with previous week's close of around 70.875c. The decline from the week's high was attributed to the fact that there was an increase in the offerings of foreign silver. The volume of business held fairly steady, prices fluctuating with the volume of offerings.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¼c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 21.25c, refinery, 20,000 lb or more; 21.50, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 21.50c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 24.50c; No. 1 yellow (No. 405) 17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.37½c; No. 12 foundry alloy (No. 2 grade) 15.62½c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 17.00c; grade 2 (92-95%) 16.00c; grade 3 (90-92%) 15.25c; grade 4 (85-90%) 14.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 34.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straights), 70.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 69.87½c; Grade C, 99.65-99.79% incl. 69.62½c; Grade D, 99.50-99.64% incl., 69.50c; Grade E, 99-99.49% incl. 69.12½c. Grade F, below 99% (for tin content), 69.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c, 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $86-$90 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.50 lb for 550 lb (keg); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 73.25c per ounce.

Platinum: $57-$61 per ounce.

Palladium: $24 per troy ounce.

Iridium: $96 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c; red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlot 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads, 20.00c; 5 tons and over, 25.00c; 1 to 5 tons, 21.00c; less than 1 ton, 21.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels, nom.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls, 41.50c fob Niagara Falls.

Sodium Cyanide: 96-98%, ½-oz balls, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Cast and rolled carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 30,000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 22.00c.

Tin Anodes: Bar, 1000 lb and over 82.50c; 500 to 1000 lb, 83.00c; 200 to 500 lb, 83.50c; less than 200 lb, 84.00c; ball, 1000 lb and over, 84.75c, 500 to 1000 lb, 85.25c, 200 to 500 lb, 85.75c; less than 200 lb, 86.25c, fob Sewaren, N. J.

Tin Chloride: 400 lb bbls, nom., fob Grasselli, N. J.; 100 lb kegs, nom.

Sodium Stannate: In 100 or 200 lb drums, 49.00c; 4 to 11 kegs, 47.00c; 12 to 20 kegs, 44.30c; 21 kegs and over, 43.50c; in 350-lb bbl, 46.50c; 4 to 5 bbls, 43.80c; 6 bbls and over, 43.00c; fob Chicago, freight allowed east of Mississippi on 100 lb and over.

Zinc Cyanide: 100-lb drums, 35.00c, fob Cleveland; 34.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 16.75, auto radiators 13.25, heavy yellow brass 12.00, brass pipe 12.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.25-19.50; No. 2 copper, 17.75-18.50, light copper 16.75-17.50; refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.50-16.00; light copper 14.25-14.75; No. 1 composition red brass 14.25-14.50, No. 1 composition turnings 14.00-14.25, mixed brass turnings 9.75-10.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 11.75-12.25, light brass 8.50-9.00, heavy yellow brass 9.75-10.00, new brass rod ends 12.00-12.50, auto radiators, unsweated 11.50-12.00, clean red car boxes 12.50-13.00, cocks and faucets 11.25-11.50, brass pipe 11.00-11.50.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linotype and stereotype 13.50-14.00, electrotype 11.50-12.00, mixed babbitt 12.00-12.50, solder joints 13.50-14.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 44.00-45.00, block tin pipe 60.00-62.00, auto babbitt 35.00-36.00, No. 1 babbitt 35.00-38.00, siphon tops 38.00-40.00.

Aluminum: Clippings, 2S, 9.00-9.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00, pistons, free of struts, 6.75-7.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Monel: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH:

Prices for open hearth grades from remote points range from $42 to $43; on electric furnace grades, $41 to $44, depending on freight.

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	38.00
No. 1 Busheling	38.00
Nos. 1, 2 & 3 Bundles	38.00
Machine Shop Turnings	32.00-33.00
Mixed Borings, Turnings	32.00-33.00
Short Shovel Turnings	33.00-34.00
Cast Iron Borings	32.00-33.00
Bar Crops and Plate	44.00-45.00
Low Phos. Cast Steel	43.00-44.00
Punchings & Plate Scrap	44.00-45.00
Elec. Furnace Bundles	43.00-44.00
Heavy Turnings	37.00-38.00
Alloy Free Turnings	33.50-34.50
Cut Structurals	44.00-45.00
No. 1 Chemical Borings	34.50-36.50

Cast Iron Grades

No. 1 Cupola	43.50-44.50
Charging Box Cast	39.00-39.50
Heavy Breakable Cast.	37.50-38.50
Stove Plate	42.00-43.00
Unstripped Motor Blocks	42 00-43.00
Malleable	46.00-47.00
Brake Shoes	35.00-36.00
Clean Auto Cast	43.50-44.50
No. 1 Wheels	45.00-46.00
Burnt Cast	35.00-36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	48.00-49.00
Axles	44.00-45.00
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	38.00-39.00
Rails, 3 ft and under	42.00-43.00
Rails, 18 in. and under	45.00-46.00
Railroad Specialties	44.00-45.00
Uncut Tires	44.00-45.00
Angles, Splice Bars	42.00-43.00

CLEVELAND:

No. 1 Heavy Melt Steel	$37.00-37.50
No. 2 Heavy Melt. Steel	37.00-37.50
No. 1 Busheling	37.00-37.50
Nos. 1 & 2 Bundles	37.00-37.50
Machine Shop Turnings	30.50-31.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00
Bar Crops and Plate	40.00-40.50
Cast Steel	40.00-40.50
Punchings & Plate Scrap	40.00-40.50
Elec. Furnace Bundles	38.00-38.50
Heavy Turnings	36.00-36.50
Alloy Free Turnings	30.50-31.00
Cut Structurals	40.00-45.00
No. 1 Chemical Borings	33.00

Cast Iron Grades

No. 1 Cupola	46.00-50.00
Charging Box Cast	42.00
Stove Plate	45.00
Heavy Breakable Cast.	44.00-46.00
Unstripped Motor Blocks	45.00
Malleable	50.00
Brake Shoes	43.00
Clean Auto Cast	50.00
No. 1 Wheels	43.00
Burnt Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.50-38.00
R.R. Malleable	45.00-50.00
Rails, Rerolling	48.00-50.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	50.00
Railroad Specialties	45.00
Uncut Tires	44.00
Angles, Splice Bars	48.00

VALLEY:

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 2 Heavy Melt. Steel	37.50-38.00
No. 1 Bundles	37.50-38.00
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	32.00-32.50
Cast Iron Borings	32.00-32.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00

MANSFIELD:

No. 1 Heavy Melt. Steel	$37.50-38.00
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	34.50-35.00

CINCINNATI:

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
No. 1 Bundles	36.00
No. 2 Bundles	36.00
Machine Shop Tunings	28.00
Mixed Borings, Turnings	26.00
Short Shovel Turnings	29.00
Cast Iron Borings	29.00

Cast Iron Grades

No. 1 Cupola Cast	44.00
Charging Box Cast	37.00
Heavy Breakable Cast.	38.00
Stove Plate	33.00
Unstripped Motor Blocks	36.00
Brake Shoes	32.00
Clean Auto Cast	43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	46.00
Rails, Rerolling	41.00
Rails, Random Lengths	41.00
Rails, 18 in. and under	46.00

DETROIT:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings.	26.00-26.50
Mixed Borings, Turnings	26.00-26.50
Short Shovel Turnings	27.00-27.50
Cast Iron Borings	27.00-27.50
Punchings & Plate Scrap	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	$39.00-42.00
Heavy Breakable Cast.	33.00-35.00
Clean Auto Cast	39.00-42.00

BUFFALO:

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	40.00-41.00
No. 1 Busheling	40.00-41.00
Nos. 1 & 2 Bundles	40.00-41.00
No. 3 Bundles	35.00-36.00
Machine Shop Turnings	33.00-34.00
Mixed Borings, Turnings	33.00-34.00
Short Shovel Turnings	35.00-36.00
Cast Iron Borings	32.00-33.00
Punchings & Plate Scrap	39.00-41.00
Elec. Furnace Bundles	38.00-39.00
Alloy Free Turnings	36.00-37.00

Cast Iron Grades

Charging Box Cast	43.00-44.00
Heavy Breakable Cast	42.00-43.00
Stove Plate	43.00-44.00
Malleable	46.00-47.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	43.00-44.00

PHILADELPHIA:

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	38.00-39.00
No. 1 Busheling	38.00-39.00
No. 1 & No. 2 Bundles	38.00-39.00
No. 3 Bundles	34.00-35.00
Machine Shop Turnings	27.50
Mixed Borings, Turnings	27.50
Short Shovel Turnings	28.50
Bar Crops and Plate	41.50-42.50
Cast Steel	41.50-42.50
Punchings & Plate Scrap	41.50-42.50
Elec. Furnace Bundles	39.00-40.00
Heavy Turnings	38.50-39.50
Cut Structurals	41.50-42.50
No. 1 Chemical Borings	31.50-32.00

Cast Iron Grades

No. 1 Cupola Cast	49.00-51.00
Charging Box Cast	47.00-47.50
Heavy Breakable Cast.	47.00-47.50
Unstripped Motor Blocks	44.00-44.50
Malleable	50 00-51.00
Clean Auto Cast	49.00-51.00
No. 1 Wheels	48.00-49.00

NEW YORK:

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.00-34.50
No. 2 Heavy Melt. Steel	34.00-34.50
No. 1 Busheling	34.00-34.50
Nos. 1 & 2 Bundles	34.00-34.50
No. 3 Bundles	32.00-32.50
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	20.00-20.50
Short Shovel Turnings	21.00
Punchings & Plate Scrap	35.00-35.50
Elec. Furnace Bundles	27.00
Cut Structurals	35.00-35.50
No. 1 Chemical Borings	25.00

Cast Iron Grades

No. 1 Cupola Cast	33.50-34.00
Charging Box Cast	41.50-42.00
Unstripped Motor Blocks	43.00-43.50
Malleable	48.00-49.00

BOSTON:

(Fob shipping point)

No. 1 Heavy Melt. Steel	$33.00-34.00
No. 2 Heavy Melt. Steel	33.00-34.00
No. 1 Busheling	33.00-34.00
Nos. 1 & 2 Bundles	33.00-34.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings	30.00-31.00
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	34.00-36.00
Chemical Borings	27.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Charging Box Cast	40.00-42.00
Heavy Breakable Cast.	42.00-44.00
Stove Plate	39.00-40.00
Clean Auto Cast	44.00-46.00

CHICAGO:

Prices for open hearth, electric furnace and foundry grades from remote points range several dollars per ton higher, depending on freight charges.

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	34.00
Machine Shop Turnings	30.00-31.00
Mixed Borings, Turnings	30.00-31.00
Short Shovel Turnings	32.00-33.00
Cast Iron Borings	32.00-33.00
Bar Crops and Plate	38.00-39.00
Cast Steel	38.00-39.00
Punchings	38.00-39.00
Elec. Furnace Bundles	38.00-39.00
Heavy Turnings	35.00
Cut Structurals	38.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
Rails, Rerolling	40.00-43.00
Rails, Random Lengths	40.00-43.00
Rails, 3 ft. and under	42.00-45.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	42.00-45.00
Angles, Splice Bars	42.00-45.00

ST. LOUIS:

No. 1 Heavy Melt. Steel	$35.50-36.50
No. 2 Heavy Melt. Steel	35.50-36.00
Machine Shop Turnings	27.25-27.75
Short Shovel Turnings	29.25-29.75

Cast Iron Grades

(Fob shipping point)

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	30.00-35.00
Heavy Breakable Cast.	30.00-32.00
Stove Plate	29.00-34.00
Brake Shoes	28.75-31.00
Clean Auto Cast	35.00-37.00
No. 1 Wheels	34.50-36.50
Burnt Cast	25.00-30.00

Railroad Scrap

R.R. Malleable	41.00-42.00
Rails, Rerolling	40.00-42.00
Rails, Random Lengths	39.00-42.00
Rails, 3 ft and under	40.00-43.00
Uncut Tires	34.50-36.50
Angles, Splice Bars	38.00-40.00

BIRMINGHAM:

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	32.50-33.00
Long Turnings	24.00-25.00
Short Shovel Turnings	27.50-28.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.00-38.50
Punchings & Plate Scrap	34.00-34.50
Cut Structurals	35.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Stove Plate	35.00-36.00
No. 1 Wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.50-30.00
R.R. Malleable	37.50-38.00
Axles, Steel	35.50-36.00
Rails, Rerolling	41.00-42.00
Rails, Random Length.	33.00-34.00
Rails, 3 ft and under	36.00-37.00
Angles and Splice Bars	37.00-38.00

SAN FRANCISCO:

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

* Fob California shipping point.

SEATTLE:

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	25.50
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES:

No. 1 Heavy Melt. Steel	$17.50
No. 2 Heavy Melt. Steel	16.50
Nos. 1 & 2 Bundles	16.00
Machine Shop Turnings	10.00
Mixed Borings, Turnings	10.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

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Sheets, Strip . . .

Supply to consumers other than car builders will remain tight in second quarter

Sheet Prices, Page 128

New York — There has been little disposition on the part of consumers to hold up specifications with mills that have not yet followed the lead of the principal producer in modifying extras. They are interested in what action may be taken, but primarily are interested in getting deliveries as quickly as possible, and hence are doing nothing that might delay receipts. Producers generally are entering the new quarter with substantial arrearages, although it would seem that in general they have made a little headway in their order books, compared with three months ago. Added railroad commitments, however, will keep this advantage from accruing fully to the general trade.

Boston—Minor price adjustments in cold-rolled strip are following reductions in hot-rolled extras. Bulk of tonnage is affected little; pickling and oiling extra for narrowest sizes is $4 to $5 lower for hot rolled, although this revision starts with sizes 9-in. and under. Changes are mostly in chemical analysis, with few involving size. Cold reducing, low carbon grades are below requirements. Consumers of flat rolled in some instances are reducing or balancing inventories to levels of key grades or products upon which operations largely depend. In motors and electrical goods this is silicon sheets. Buying is also more realistic, being directed more toward needs for actual production rather than inflated estimates. Purchases of premium-priced stock is in small lots for direly needed fill-ins and involves only a small tonnage. Demand for shoe shank steel and tack plate holds at high levels.

Philadelphia — Sheet consumers will enter the new quarter with prospects of little, if any, improvement in their supply. Some, in fact, without any established sources of supply, but who have been receiving tonnage under government directives for housing work, may not receive as much under the voluntary allocations which become effective Apr. 1. In any event, most will have to prove their needs for critical housing work more conclusively than heretofore.

Pittsburgh—No significant easing in present tight supply of flat rolled steel is indicated until fourth quarter at earliest. Consumers' inventories, except in a few isolated instances, are well below requirements. However, increasing concern is expressed over accumulation of consumer goods' inventories.

In sheets, supply of stainless is the only item which shows signs of soon becoming in balance with demand. Some improvement is noted in the demand-supply balance in enameling and electrical sheets, but mills report production will not match demand for some time. Some reshuffling of distribution pattern in favor of long-standing customers will develop now that distribution of sheets for the federal housing program is on a voluntary basis.

Metalworking companies here state supply of hot-rolled sheets, particularly 14 gage and heavier, is far short of present needs. Producers state that output of nearly all flat-rolled products is lagging well behind huge demand accumulated during the war. It is no secret that tin plate and cold-rolled sheets are more profitable items than plain hot-rolled sheets, and as long as demand continues heavy for the former items, it is only natural these facilities will be operated at capacity.

Chicago — More and more consumers of sheets and strip are being forced to reduce working hours because they are unable to obtain from mills or other sources sufficient steel to maintain present operations. With sheet and strip mills now operating as close to capacity as is possible and with more of the production being diverted to railroad car builders to support the expanded production program just getting under way, the tonnage of sheets and strip available for general distribution will shrink somewhat. One sheetmaker already has informed its customers that second quarter quotas will be reduced 15 per cent.

Cincinnati—Maintenance of high production in district sheet mills, probably affected less than some others by gas shortage and other factors, is reflected in the light carryover into the second quarter. Mill interests therefore are confident they can meet more closely their commitments, although the supply situation is as tight as ever with little hope extended to those seeking more tonnage than allocated. District mills are intent on stamping out the "gray market" and already can cite instances where shipments, to those who have diverted steel for usurious prices, have been discontinued.

St. Louis — Sheet production in this district halted Mar. 25 because of a strike of 40 roll-turners and it was uncertain it could be resumed later in the week. Strike was at the Granite City Steel Co. Officials expected to continue ingot production temporarily. Company already has an eight-month backlog of orders despite the fact that books have remained closed since before the first of this year.

Birmingham—Sheet producers remain under continuous pressure for earlier deliveries and increased allocations as demand for sheets apparently inches up consistently throughout the Southeast. Reports indicate the current boxcar shortage also is adding to difficulties. Some strip, consisting mostly of cotton ties, is being produced in this section.

Plates . . .

Plate Prices, Page 129

New York — Export licensing has been re-established on plates, effective Mar. 22 and applying to all grades, including floor plates, excepting alloy material.

This action, in imposing closer control on plates, was prompted by a desire to assure more adequate relief for the domestic freight car program, it is believed in some trade quarters.

As indicated, a severe stringency continues in plates, and while some relief is expected in third quarter, it is believed supply will continue to fall behind demand for the greater part of the year. Leading producers, without exception, are entering the second quarter with substantial arrearages.

Boston—With emphasis on acquisition of tonnage, steel costs cover a wide spread for plate fabricating shops. Not until supply is eased will competition by mills for tonnage correct this. Meanwhile plate users, particularly small tank builders, are short of material and operations are sensitive to available supply. Not only are lighter gages far short of requirements, but heavier stock is lagging with flame-cutting and weldment production affected. One Rhode Island builder of color presses, hampered by lack of heavy castings, is using weldments for side frames and bases. Plate needs for standpipes and elevated water tanks are below last year, but a standpipe, requiring 150 tons, will be built at Brewer, Me. Clad plate application is gradually being extended, notably for rolls in the rubber, paper and textile industries. In contrast to carbon plates, deliveries of clad plated products range from 6 to 8 weeks.

Philadelphia—Eastern plate mills generally plan to modify extras in line with changes made recently by Carnegie-Illinois Steel Corp., with one expected to announce revisions effective retroactively as of Mar. 24 and another as applicable Apr. 1. In fact it is believed that most will have the new schedules in effect by the first of next month.

Plates continue as scarce as ever, with no early relief in sight. Operations are improving but are still not at capacity, due to the raw material situation, particularly in pig iron, and the improvement in output so far has made little dent in backlogs. There is talk of a fairly close balance between supply and demand by late third quarter, but that remains to be seen. At present some mills, which have accepted bookings well into the future, are sold out for the remainder of the year and are taking nothing for shipment beyond.

Birmingham—Demand for plates continues strong and the overall supply is still far from adequate to take care even of established needs. Materials limitations have affected production in some lines, notably carbuilding, while the tonnage going into tanks and structural work continues exceptionally large. Large backlogs remain for indefinite disposition.

Wire . . .

Wire Prices, Page 129

Boston—To the extent slightly more drawn round wire is offered by one or two mills, supply with some consumers has improved. This does not apply in rods, which again emphasizes that producers are drawing more of their own semifinished. Users are frequently taking over-sized rods and wire and redrawing to size. There is a trend toward more cautious buying and some deferments which generally reflect attempts to balance inventories, especially as to sizes. There is no easing on mill production and most producers are behind on commitments. Backlogs contain less ficticious tonnage, many users estimating requirements closer to needs, causing some realignment of schedules. Bessemer and resulphurized basic are short with most consumers.

Chicago — Although production of all grades of wire and wire products is at high rate, allocations are insufficient to meet consumers' demands and increased quotas are sought relentlessly. Short supplies are said to be slowing up fabricating operations and holding employment down. Nails for use in housing are in more demand than those for industrial use and packaging. Shortage of barbed wire is serious, and rural users are pressing for galvanized fence wire in 5-pound

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coils for fence construction. Requirements for bale ties is expected to exceed that of last year when needs could not be met. Serious shortages exist in fence posts and heavy netting. Wire rope is in comparatively good position.

Steel Bars . . .

Consumers show concern over second quarter supply of hot carbon bars

Bar Prices, Page 128

Philadelphia — Easing in demand for hot carbon bars is ascribed in part to inability of consumers to obtain other types of steel required in the manufacture of their products. Once their stocks become more in balance, a spurt in specifications will set in. However, what easing there has been in the small sizes, ⅝-in. and under, is so slight as to be almost negligible, with producers well behind on commitments. Another factor is a somewhat better supply of hot carbon due to shrinkage in cold-drawing requirements. Alloy bars continue plentiful, with deliveries averaging around four weeks on the hot grades.

Boston—If more bar consumers, including forge shops, get the steel ordered for second quarter, supply will approach requirements, based on current production. Carryovers are slightly lower with several producers, and other signs of gradual easing in carbon bars include improved supply in lower ranges of sizes, notably in cold-drawn. Below ⅝-in. the improvement does not apply.

Inquiry for cold-drawn is slower and mills could handle more electric furnace tonnage. Stainless and alloys are in balance with demand, and alloy orders are sometimes used as a wedge to obtain carbon stock.

New York — While there is a general easing in medium and larger sizes of hot-rolled carbon bars, certain producers claim they are in no better position than they were three months ago, despite a well sustained rate of output since the beginning of the year. They ascribe this as due in part to commitments for tonnage for the railroads and builders of rolling stock in the second quarter. However, all producers, it appears, are in somewhat better position on cold-drawn carbon bars and on alloy bars. Some sellers are able to make fairly prompt shipments on hot alloy bars and can promise delivery on cold alloy stock within four to six weeks.

Pittsburgh — Some easing in demand for large rounds is developing with sellers now offering fairly reasonable delivery promises. However, there is no indication of any let-up in pressure or early shipment in the smaller sizes. Demand for cold-drawn bars has recorded little change, although some consumers are watching inventories more closely than six months ago. Other producers have followed lead of Carnegie-Illinois Steel Corp. in revising bar extra card.

Producers hope confusion of what constitutes a "killed" will be remedied by recent position taken by leading producer that sizes 3-in. and over must take the special bar quality extra of 15 cents per 100 lb. Regardless of size, all steel with specified silicon content, or specified as killed steel, or fine grain, or resulphurized, must take the special bar quality extra. Silicon extras have been reduced $2 per ton across the board, which means in case of high carbon or large sizes there is no extra for silicon. There is no base size for the range 1½ to 1-15/16-in. for rounds, squares and round cornered square; a reduction of $3 per ton for this size range previously carried an extra of 15 cents per 100 pounds.

Chicago — Consumers of bars, still pressing mills for more tonnage than they are allocated, are becoming concerned over what the accelerated railroad car building program will do to second quarter quotas. Some sheet-makers have already cut back quotas for sheets, and similar action by barmakers would come as no surprise. One manufacturing company which has been able to maintain reasonably good operations because it was able to purchase long crop ends of billets from a small roller at prime prices now finds this supply being cut off because these crops can be disposed of in Mexico to better advantage.

Structural Shapes . . .

Structural Shape Prices, Page 129

Philadelphia — Shape supply remains tight, with one eastern producer having decided to blank out June as well as April in the shipment of second quarter tonnage, due to pig iron shortage. If all goes well, this seller should be current by the beginning of third quarter. Another producer will blank out April, as mentioned in a previous issue, in an effort to bring commitments into balance, and still another, confronted with special difficulties in obtaining raw materials, is accepting tonnage only on a highly selective basis.

Boston—New inquiry for fabricated structural steel is slackening except for moderate bridge requirements, which are below normal for this season. Hampden Beach, N. H., bascule bridge involving 950 tons is being refigured, and 350 tons are required for approach spans, Connecticut river high-level bridge, Old Lyme, Conn. District fabricating shops have order backlogs well up to extent of current and potential quotas for plain material and experience more difficulty in rounding out requirements from warehouses, whose inventories are low. Erection schedules on many projects are behind. What chance structural mills had of making up some ground on deliveries appears endangered by mounting freight car requirements.

New York — Structural steel bookings in February amounted to 124,436 tons, an increase from the revised total of 101,869 tons placed in January. The estimated total for January and February was 226,305 tons, or an increase of 11 per cent over the average of 203,858 tons booked in the same months in the average five prewar years, 1936-1940. February shipments totaled 123,148 tons, a slight decrease from January, when the revised total was 129,387 tons.

Chicago—New inquiry for fabricated structural steel aggregates about 5000 tons, this tonnage being spread over 12 projects in Illinois, Wisconsin and Iowa—every one being public construction, principally highway bridges, grade separations, and the like. There is a dearth of new industrial work at present because building costs are judged to be too far out of line. Fabricators are well booked up considering the plain shape tonnage allocated to them by mills, and also in view of the fact that the expanded freight car construction program about to get under way threatens present mill quotas.

Tin Plate . . .

Tin Plate Prices, Page 129

Pittsburgh — Tin plate supply is expected to remain well below stated needs of most consumers through rest of year, despite very good first-quarter production showing an indicated expansion of operating facilities scheduled to be brought into service later this year. With beer, coffee and other products now packaged in tin plate containers, electrolytic tin plate requirements soon are expected to match that of hot dipped. The indicated slight reduction in tin plate requirements for perishable food packs is expected to be more than offset by tin plate requirements for general line cans.

Tin plate producers still are faced with possible continuation of export directives next quarter, and at the same time must meet rising seasonal domestic requirements.

Prospective extension of tin coating controls is not expected to be resisted by tin plate producers. It appears these controls will have to be continued with little improvement indicated this year in pig tin supply.

Chicago — Demand for tin plate is so heavy that virtually all consumers are pressing producers for tonnage in excess of quotas. Mills, already operating at the highest capacities that supply of tin and black plate will permit, are unable to accommodate this pressure. Box car shortage impedes shipments from day to day but occasionally car supply picks up to permit moving accumulated production.

Tubular Goods . . .

Tubular Goods Prices, Page 129

Boston—Pipe fabricators appear oversold on basis of current pipe supply and are urging heavier shipments and increases in allocations. Distributors got slightly more pipe in March, coming near quotas, but inventories are limited and unbalanced with mills still behind delivery schedules. Direct shipments are out for this year and substantial utility requirements loom for next. In tubing, seamless special, mechanical and pressure grades are short with electric welded capacity taken for months. Only stainless and a few alloys can be delivered soon, eight to ten weeks. In spots, tubing demand is easing, notably for baby carriages, and distributors are easing their pressure slightly. These cases, however, are exceptions.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 128

Boston—Limited tonnage of reinforcing bars available restricts fabricators and distributors in making forward commitments involving large tonnages. However, to meet volume already under contract, supply is better. Inquiry is heavier and is led by 1200 tons for Holyoke dike, Connecticut River flood control project. Several hundred tons are also active for highway and bridge projects in Connecticut.

Chicago — Inquiries for reinforcing steel have taken a decided spurt here within the past two weeks, by virtue of

several grade separations and highway work for Cook county, Ill. Aggregate tonnage is not large, amounting to only about 2000 tons, including bars and mesh, but this is large tonnage in light of the presented limited supply. Inquiries for industrial and miscellaneous work are almost negligible, except for very small lots.

Pig Iron . . .

Only slight easing in pig iron supply expected in second quarter

Pig Iron Prices, Page 130

Philadelphia — Government pig iron allocations for soil pipe manufacturers in April are substantially the same as for March and, except in one or two important instances, foundries engaged in other types of critical housing work will also receive about the same amount under the voluntary program set up by pig iron producers.

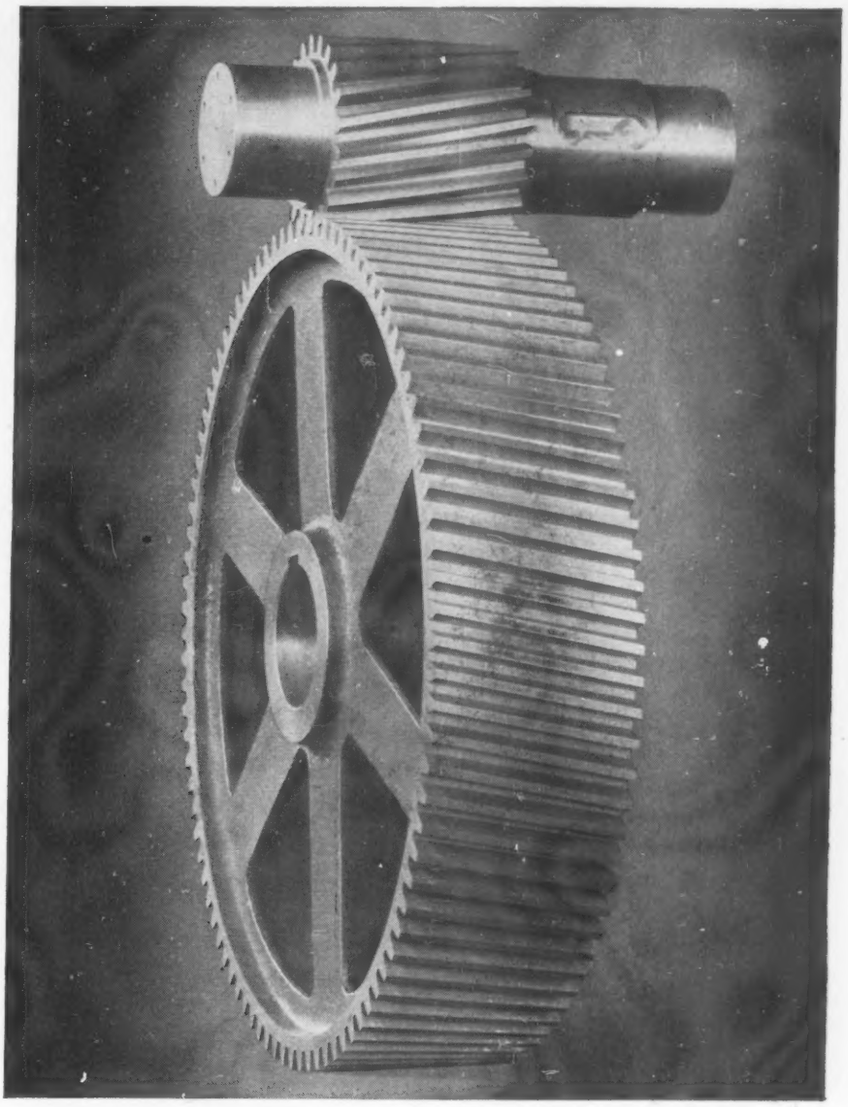
Consumers engaged in nonhousing production, including some nonintegrated steel producers, stand to benefit a little on next month's quotas, but not much, for the reason that pig iron production, as it will probably affect this district, will show little change. At the same time there might not be quite the pressure for pig iron, at least from the steel mills, for the reason that steel scrap supply should be easier. Some mills have stepped up the scrap ratio in their melt to about the highest point practically feasible, but certain others would still use more scrap, if more were readily available and at more attractive prices.

However, there will be a continued strong demand for iron and some interest is even being shown in Texas iron. It would appear that it could be brought into this district at around $50 a ton, and at that price might prove attractive, if tonnage could be had for prompt or April shipment, but that clearly seems out of the question.

Dallas, Tex. — "Firm orders" for 415,000 gross tons of pig iron from the government-owned Daingerfield, Tex., blast furnace have been received by Lone Star Steel Co. here, company officials state and add that prospective orders for 923,000 gross tons are under negotiation. This tonnage is about three times the furnace's capacity for the next two years, they explain, and production will have to be allocated, local consumers receiving preference.

St. Louis — Demand for pig iron remains far below supply with no prospect for improvement. Local furnaces have produced at capacity several months and no new furnaces are contemplated. Supplies from Birmingham and Chicago to this district have remained unchanged several months. Inquiries by other melters at Koppers United increased early last week at the prospect of a shutdown at Granite City Steel Co., which takes nearly half of Koppers' output in hot form. Granite City, however, so far is continuing ingot production. Mounting pig demand here is attributed almost entirely to the scrap scarcity.

New York — Although soil pipe manufacturers only are scheduled to obtain pig iron next month under mandatory allotment, other producers of castings for the housing program, who are receiving



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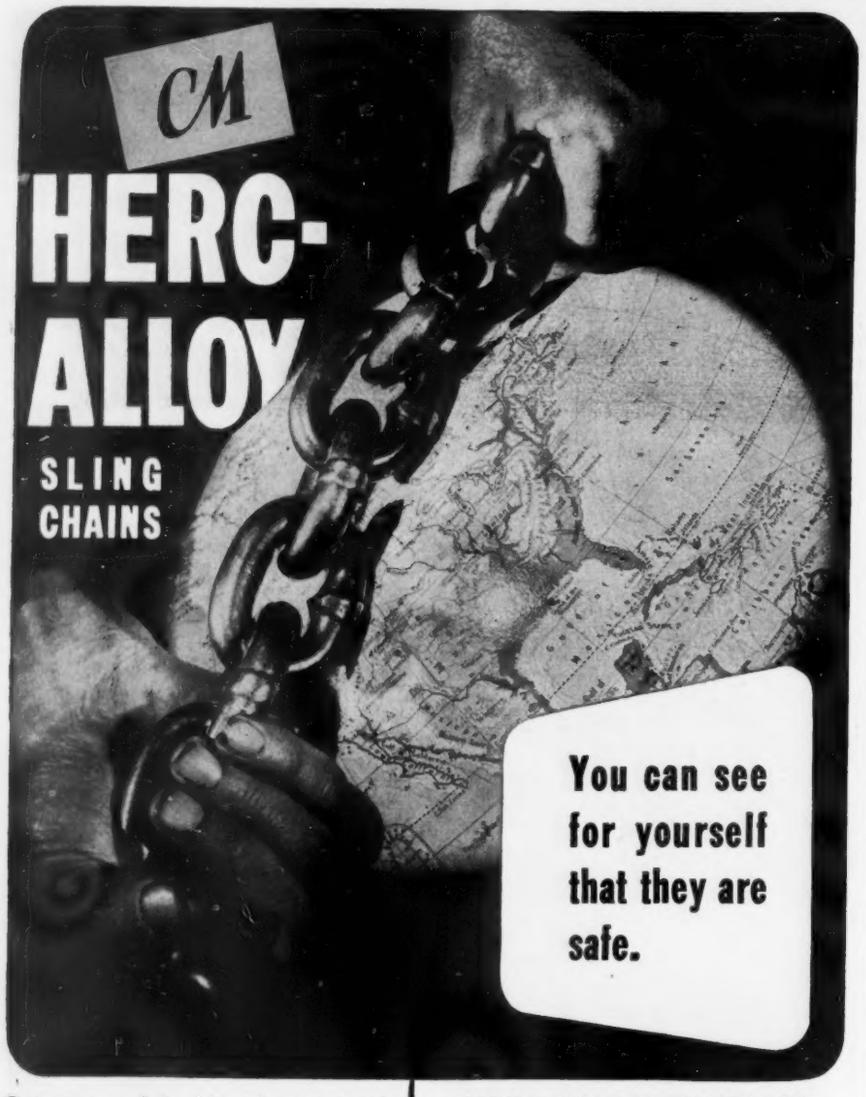

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iron under government allotment until the end of March, are counting on receiving the same amount in April under the voluntary distribution plan agreed upon by the pig iron producers that they are receiving this month.

Thus, if this should prove to be the case, and there is no pick-up in eastern foundry iron production, those not engaged in critical housing work will receive little relief, continuing to operate on the basis of possibly 70 per cent of normal, as estimated for the month now closing.

While Texas iron has been offered New England consumers, none has been quoted in the local market, so far as can be learned.

Boston—With Buffalo and outside furnaces shipping little iron into New England, a situation likely to continue in April, pressure for outside tonnage is heavier. The pressure stems from consumers reluctant to cover with long-term contracts for a percentage of estimated requirements on a cost-plus basis with the stipulation that prices are not to exceed the Buffalo delivered price by more than $5. Some such arrangement might confront them with expiration of the premium plan operative in this territory at end of second quarter.

Diminishing receipts of foreign ore will aggravate the shortage with no easing seen in the near future. Mystic production of around 15,000 tons a month going entirely to district melters is probably more than the tonnage coming in before that furnace went into production. Overall supply situation is somewhat better than that of other eastern districts, although still not enough to satisfy potential melt.

Consumers are paying the lowest price in the country for foundry iron—or at least for that tonnage produced at Everett, Mass. If bought from Buffalo this iron would cost $9.48 a ton more. Until competition forces a change, Buffalo and outside iron will probably continue to be sold on an fob basis. Fundamental economics would suggest that tightness in iron supply will not be eased until steel scrap prices are lower or until steelworks readjust melt mixtures to take less basic and thus make possible more steelworks iron. At present scrap prices, the ratio of iron to scrap will be high whatever the mills' operating rates.

Buffalo—Midweek snow squalls accompanied by winds of gale proportions again interrupted pig iron operations. Frozen switches and biting winds forced one of the top merchant iron producers to resort once more to piling iron. Raw material shortages became more of a problem as a serious fire caused heavy damage to the Buffalo Sintering Corp., an ore reclaiming concern.

Pittsburgh — Contract negotiations are under way with AFL union representatives and 16 foundries representing 750 workers in this district. Some of the key demands placed before the foundry group by the union are: Hourly wage increase of 23 cents; 7 paid holidays; sick leave and accumulated vacation pay provisions; check-off of union dues, and establishment of a 10 per cent wage differential for night shift employees. Settlement of these demands is anticipated without a strike.

More equitable distribution of merchant pig iron in this district is indicated as a result of elimination of directive tonnage for the federal housing program Mar. 31, except for producers of soil pipe and fittings. The entire output

of merchant iron in this district next quarter will thus return to a voluntary distribution pattern, no soil pipe producers being in this area. Indicative of the tightness of pig iron supply here is the fact the lone merchant blast furnace produces only 60 per cent of the stated monthly requirements. This pig iron supply problem has been accentuated by shortage of cast scrap and drying up of merchant iron shipments here from other districts.

Some foundries report receipt of offers to sell iron originating at the Daingerfield, Tex., blast furnace, $45, f.o.b. furnace. Offers made foundries here were under the company name of Thermo Products Co., National Press Bldg., Washington, D.C. Sales of this iron have been reported in the New England area but as yet no foundry here has bought any.

Chicago — Producers and suppliers of pig iron are being pressed by foundries for every ton of iron they can get. Quotas are insufficient to maintain melting operations at the levels which foundries would like to schedule and they seek increases in their allocations. Ironmakers are obligated to maintain flow of iron to the housing program on a voluntary basis and only time will tell whether the shift from controlled to voluntary allocation is going to result in more iron being available to foundries in general. Operating blast furnaces in this district hold at 37, with bulk of output going to hot metal to support steelmaking activity, leaving much to be desired in tonnage for sale.

Cincinnati—The melt in this district is holding within close bounds, neither pig iron nor scrap being available for desired expansion against the pressing demand for castings. Despite ending of some allocations, furnace interests are offering little hope for increased tonnages soon to those recently without the ratings. Foundry coke supply is tight to the extent it would prove a bottleneck if other requirements were had in unlimited quantity.

Birmingham—Pig iron production is maintained on a high level. Accumulated need for iron, however, together with the expanded current needs, holds the supply situation tighter than it has been in the history of the district even during the war. Even sizable relaxation of CPA certification will not measurably ease the local situation, furnace interests declare. Most iron-dependent plants continue to operate considerably below capacity.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 129

Cleveland—Industrial gas curtailment in the area last week again cut output of bolts and nuts. Although production of finished bolts and nuts continues to extent steel supplies allow, output is far below demand and is expected to continue so for an indefinite time.

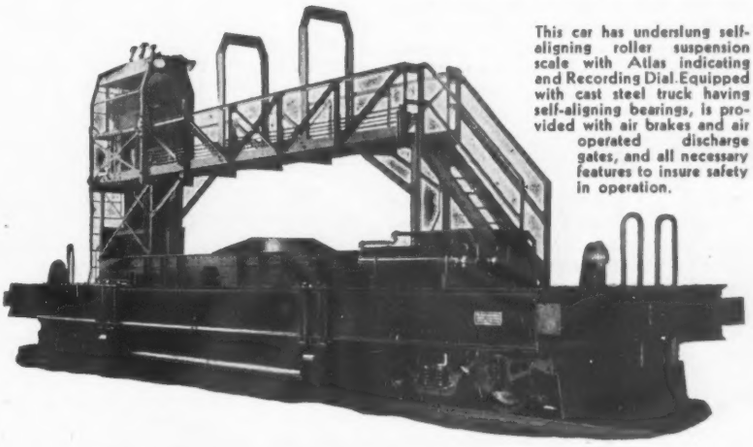
WAA To Sell All Surplus Bolts and Nuts by Apr. 30

Washington — All surplus ferrous and nonferrous bolts, nuts, screws, rivets and related items, except aircraft types, held by the War Assets Administration are scheduled for disposal by Apr. 30. These items had an original acquisition cost of $10 million.

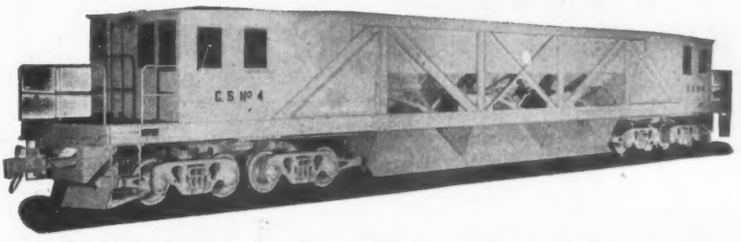
ATLAS

ORE TRANSFERS AND SCALE CHARGING CARS

30 TON CAPACITY DOUBLE HOPPER SCALE CHARGING CAR



This car has underslung self-aligning roller suspension scale with Atlas indicating and Recording Dial. Equipped with cast steel truck having self-aligning bearings, is provided with air brakes and air operated discharge gates, and all necessary features to insure safety in operation.



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Used for stocking and reclaiming. Hopper has three compartments each with independently operated discharge gates. Double end control so that operator is always in the front end of the car. Car is powered by four 125 Horsepower Motors with series parallel reversing-plugging type, full magnetic control. Hoppers are provided with electric heaters to prevent freezing of load in severe weather.

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Scrap . . .

Weaker price tone develops in major consuming areas . . Shipments at high level

Scrap Prices, Page 134

Pittsburgh — Next major price movement is expected to be downward, as indicated by weakness in prices already developing in other major consuming areas. Local open-hearth scrap grades continue to sell at $38, but consumers here now can obtain these items from New England and other eastern areas at $2 to $3 less than was the case a week to ten days ago. Price range for remote scrap delivered here thus is now $41 to $43 for steelmaking grades, in contrast to the previous price spread of $42 to $46.

A number of leading producers have again withdrawn from the market in objection to the exorbitant high scrap prices, but their chances of success are considered much brighter now than was the case earlier this year. Mills still placing new orders for scrap are doing so on a relatively limited basis. This cautious buying policy, plus concerted effort of scrap dealers to clear their yards as soon as possible of high priced material, is considered important indication of the pending reversal in local scrap quotations.

Record peacetime steel production this quarter has made possible a high level of metalworking operations, which in turn has made available an increasing tonnage of scrap for the steel mills. Some improvement in shipments of remote scrap developed last week; however, mill scrap inventories still have a long way to go to reach normal volume in relationship with present high operating pace.

The abnormal drain on pig iron supplies resulting from the practice of steel producers increasing the proportion of hot metal in their open hearth operations, up to 75 per cent in some instances, has caused a serious shortage of merchant iron for foundries. As long as this situation prevails, the market for cast scrap probably will remain very strong. This mill practice undoubtedly will be adjusted as supply of open-hearth scrap grades becomes more plentiful and the price disparity between basic pig iron and open-hearth scrap assumes a more realistic basis.

Pennsylvania Railroad's latest scrap list went at predicted price levels, namely $38, including commission, for heavy melting steel.

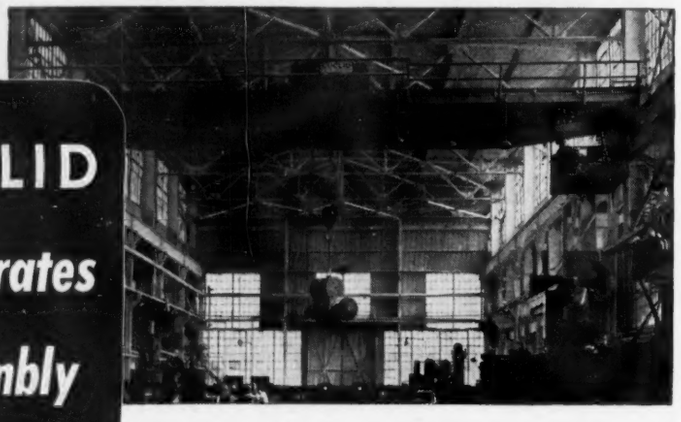
New York — Scrap prices declined further here last week with brokers offering $34 to $34.50, fob shipping point, for No. 1 and No. 2 heavy melting steel, No. 1 busheling, and Nos. 1 and 2 bundles. No. 3 bundles were quoted $32 to $32.50. Turnings took a heavy drop, machine shop turnings and mixed borings and turnings being quoted $20 to $20.50; short shovel turnings, $21. Punchings and plate scrap and cut structurals were quoted at $35 to $35.50, electric furnace bundles at $27, and No. 1 chemical borings at $25. No. 1 cupola cast was off about $2 to a spread of $33.50 to $34. Charging box cast also was reduced to $41.50 to $42. Unstripped motor blocks and malleable were nominally unchanged.

Most major consumers of melting steel were out of the market, although some orders were placed with prices on a downward scale.

Boston — Steelmaking scrap prices declined $2 a ton last week in the first reaction since prices advanced $11 a ton after the temporary post-decontrol level of $25 for heavy melting steel. Further realignment of prices downward is indicated. Borings and turnings, which have for the most part not maintained normal differentials with heavy melting grades are generally following the Pittsburgh delivered price, based on freight to that destination. Consumer buying on the decline is hesitant. Cast grades for the most part are unchanged.

Philadelphia — Following the recent sharp rise, prices on steelmaking grades of scrap have dropped. In this district, the decline amounted to $1 to $2 a ton and, while there may be brief intervening periods of leveling off, further reductions are expected. However, no sharp changes such as those which characterized certain stages of the advance are anticipated, especially as long as steel production continues at its present high rate. Momentarily, with most melting steel consumers standing by in an effort to gage the extent of current weakness, reductions are being based mostly on offerings of sellers. The melting grades, No. 1 busheling, and No. 1 and No. 2 bundles are now holding at $38 to $39, delivered, and No. 3 bundles at $34 to $35. Machine shop turnings and mixed borings and turnings have declined more sharply, now being offered at around $27.50, and short shoveling turnings are off $3.50 to $4 a ton, holding at $28.50. The principal low phos grades are unchanged for the present, although reflecting a weak undertone. Electric furnace bundles are off $1 to a spread of $39 to $40, and heavy turnings are down to $38.50 to $39.50. Two leading consumers of No. 1 chemical borings have dropped their buying prices substantially, with a result that the market is now $31.50 to $32, delivered. While cast iron grades are fundamentally strong, No. 1 cupola and clean auto cast are down slightly to $49 to $51, delivered. However, certain leading pressure pipe foundries are inquiring more actively, as they expect to receive less pig iron in April than they did in March.

Detroit — Although the scrap market definitely has broken throughout the country, prices quoted here are unchanged for the reason they are based on what local mills are paying, and in recent weeks some tonnage had been moving at higher prices. This ordering has ceased, and it is expected within a week prices will be off by $1 per ton. Steel mills would prefer not to see the market break sharply, realizing that movment of scrap was greatly accelerated by today's high prices and a sharp decline in price could halt this movement. Contrary to expectations the market broke first in New England on March 22, and weakness quickly spread to other areas. Reflecting the much improved supply situation, one mill in the Pitts-



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burgh area had 700 cars of scrap on track one day last week. Further, it is estimated high prices brought approximately 1 million tons of good quality steel and cast scrap out of the South and Southwest. Additional bulwark to supply of scrap was the policy of many yards, such as automotive junkers, in selling usable parts as scrap which might normally have been held in inventory until sold as replacement parts.

Buffalo—Jitters and tension crept into the scrap market this week as both consumers and dealers expressed a feeling of uncertainty over additional sales at recently-established advanced prices. Both sides question whether prices are considerably out of bounds on the upside. Heavy melting and bundles are quoted anywhere from $40 to $45 a ton. Price breaks running into two figures are predicted by some, but so far supplies have been too negligible to bring about any marked recession. An unseasonal return of winter weather is again hampering yard operations. In addition, demand has lost none of its potency. Mills are reported runing down dealers' offerings on short sales.

Cleveland — A weaker undertone developed in market here last week for steelmaking grades. Foundry grades held firm though some interests reported an easier tone. Purchase of remote scrap for shipment into this district halted, eliminating sales at levels well above quotations for local material. Consumers were cautious, following the break in prices, and remained temporarily out of the market. No. 1 heavy melting steel was quoted $37 to $37.50. Cast grades were firm since foundries are not getting relief on pig iron. Weakness was not pronounced in railroad scrap, although No. 1 heavy melting was quoted slightly lower at $37.50 to $38. A further decline in prices is expected soon. Shipments of scrap into this district were the heaviest in history during the week ended Mar. 22, although they declined slightly last week due to the blizzard which hampered transportation.

Chicago — Indications are appearing that prices of scrap have reached their peak and that some moderation could come at any time. Top prices still were being paid last week for heavy melting steel of local origin, but there is less disposition for consumers to pay premiums on remote material. Furthermore, secondary grades of scrap are not in as strong demand as recently. Shipments are holding at heavy volume, although they suffered temporarily from the blizzard the early part of last week. While steelmakers in this district may be putting some scrap down in inventory, the tonnage cannot be great, because steelmaking operations have gradually crept up to 96.5 per cent of capacity, the highest since June, 1945. Support of this rate is taxing supplies of both blast furnace hot metal and scrap.

St. Louis — The scrap price situation here continues obscure. Improved shipments have given rise to widespread predictions of a price dip but individual cars can still be peddled at premiums often enough to prevent any general setback. Price resistance, however, is becoming general among big users. The offsetting factor is doubt whether this summer can produce the usual seasonal increase in shipments. Instances of long cross hauls are numerous and tie-in sales of steel persist. Mill reserves remain at two to three weeks and those of foundries, 30 to 45 days.

Birmingham — Dealers and jobbers report they are able to get little semblance of order out of the district's scrap market. Some increase in volume of scrap moving is noted, especially with better weather in the past week, but price structures seem to mean little, scrap bidding being elusive and prices apparenty being made on the spot according to the need for material and ability to pay.

Cincinnati — Iron and steel scrap is softer, especially in steel grades although there are some melters still in market for material without undue resistance to recent asking prices. Reports that several of the major scrap consumers were out of the market served to check the upswing, according to the attitude here. Heavy melting steel is down $1 from the recent peak. Cast grades are unchanged, with demand as vigorous as ever. Movement of scrap continues fair, with most improvement in production grades.

Rails, Cars . . .

Track Material Prices, Page 129

New York — While some observers doubt that domestic freight car orders this month will run as heavy as in February, there appears to be little question that bookings will be substantial. Orders during the first half of the month in particular were fairly well sustained.

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Warehouse . . .

Warehouse Prices, Page 131

Cleveland — Last week's snow storm, hitting the area with cyclonic fury, forced almost complete suspension of steel deliveries by truck to and from local warehouses. Although a few city deliveries could be made in the middle of the week, no out-of-city runs were attempted. A rail embargo invoked against several jobbers prevented delivery of some steel, although by midweek shipments to most had been resumed. Structurals, sheets plates and angles are still in acute supply, with prospects of deliveries of these items becoming worse in second quarter. One jobber here, after having an order for angles on a mill's books for 14 months, was advised the mill had stopped producing that item and no deliveries would be forthcoming.

Pittsburgh — Mill shipments to steel distributors registered little change during March, although one warehouse reported a moderate decline in March steel receipts and aggregate first quarter mill shipments below those recorded for final 1946 period. This interest states its overall stock position was reduced slightly each month this quarter. Extent inventories are unbalanced is indicated by report of another warehouse that structural shape sizes now in stock represent but 30 per cent of normal number of size ranges carried. While present warehouse steel inventories are very low and seriously unbalanced, there is some indication that mill shipments to distributors will register substantial improvement, at least on the basis of present mill delivery promises. Release of new warehouse stock price books have been delayed by substantial revision in size, treatment and chemistry extras recently put into effect by the mills on a number of steel products, notably bars and plates. There is no official indication yet as to what extent distributors will follow latest mill product extra revisions.

Cincinnati—Warehouse steel is far short of the tremendous requirements. On scarcest items, mill shipments move out quickly after arrival. Buyers probing for stock show desperate straits by acting as gleaners, accepting insignificant shipments whenever usable steel is found.

Chicago — Sales and distribution of steel from warehouses undergoes little change from week to week. Consumers seek more than is available in virtually all products, with exception of alloys. Flat-rolled products are in the tightest position. Large sizes of carbon bars are in somewhat less demand than recently, but small sizes are seriously short. Supplies of light structurals and wire are also short.

Philadelphia—Business of leading jobbers here for the month now closing will be in almost direct ratio to the tonnage received from mills, some reporting a better daily business than in February and others, a slight decline. This will be especially true in the flat products, plates as well as sheets. Jobbers will have their price schedules revised shortly, reflecting the recently announced revision of extras on a number of products. At least one district warehouse is putting new prices into effect Apr. 2 on tool steel, in line with mill changes made a while ago. The net change will amount to an increase of 2 to 3 per cent.

Boston—Warehouses are making minor revisions in prices in line with changes in mill extras, but they show more concern with second quarter steel supply. Distributors have less firm tonnage on mill books for delivery during that period and are experiencing no letdown in demand for products in short supply, namely plates, shapes, small bars and flat-rolled. One of the few metalworking industries asking less is the machine tool builders. Not until late third quarter do distributors look for an easing in above named products, although in cold-finished bars and cold-rolled carbon sheets there are scattered signs of an improved supply before then. On the whole cold-rolled sheets are as scarce as hot-rolled, but some unexpected tonnage has been offered lately.

Refractories . . .

Refractories Prices, Page 130

Cleveland — Supply of refractories generally balances demand here, although shipping is becoming increasingly difficult as freight car shortages mount. No reports have, as yet, been heard of refractory consumers who have been forced to curtail production because of slowness of deliveries, although this possibility is beginning to arise for some consumers not located near main lines or principal spur tracks. Steel drums used by producers for packaging some refractory specialties are critically short and may cause some delay in shipping.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 130

Cleveland—Production of by-product coke, already insufficient to meet demand, was retarded briefly a week ago by a short-lived strike in the plant of one of the area's largest producers. Interruptions of this type would normally cause little disruption in flow of coke from stocks, but now producers are unable to build inventories, coke leaving their works almost immediately after production, and the effect of work stoppages is felt immediately. Coke consumers generally are on a hand-to-mouth basis and new customers experience extreme difficulty in obtaining fuel. Poor quality coking coal accentuates producers' difficulties as does the mounting freight car shortage.

Philadelphia—The largest producer of by-product foundry coke in the east will shortly reduce production of this fuel by 8 to 10 per cent to make long needed repairs to equipment. These repairs will continue throughout the spring and greater part of the summer. District foundries will not be able to build up inventories to the usual extent with the arrival of spring weather and the seasonal easing in the demands of the water gas producers. Foundries will be further handicapped for the reason that the water gas producers have made exceptional demands on by-product coke producers this past winter, contributing to almost a clean sweep of stocks at the ovens.

Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
Hard Drawn Spring Wire
Heddle Wire
Hose Reinforcement Wire
Mandolin Wire
Music Wire, bright, tinned or alloy coated
Piano Wire, perfected quality
Rope Wire, bright or galvanized—mild plow, plow, improved plow
Seal Wire
Stainless Steel Wire
Stapling Wire
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Canada . . .

Toronto, Ont. — Canadian mills are maintaining production of finished steel materials to the maximum of their raw materials supply, but are making little progress toward catching up with demand. On practically all materials, mills are booked through second quarter and on some lines there will be large tonnage carryover into third quarter. At present, new bookings are comparatively slow because producers are not seeking additional orders at this time and some have actually withdrawn from the market.

While there were expectations that March would see the end to many controls and price regulations of iron and steel, it is now apparent that most controls will be extended for at least 60 days. In the meantime, Canadian prices remain unchanged from levels established a year ago, and producers are accepting forward delivery bookings with the stipulation that prices be made known at time of shipment. Actually developments in the Canadian steel markets show little change from earlier weeks over the past year or more and there seems little hope of supply equaling demand for at least another six months even at the accelerated rate of production.

Demand for steel sheets and carbon bars is expanding steadily and there is no surplus capacity of these materials to the end of June, while some producers have bookings that will result in substantial backlogs to be carried into third quarter. On steel plate, however, bookings are held within smaller range and orders are being closed for two-month delivery, while demand is moving rapidly ahead as a result of increased operations in railroad car and locomotive plants and heavier buying on shipbuilding account.

Pig iron sales are moving steadily ahead and are currently averaging about 12,000 tons per week. The gain in pig iron demand is largely due to the serious shortage in iron scrap materials which is forcing melters to making greater use of iron in their melting operations.

The shortage of scrap has reached serious proportions and dealers do not look for much direct improvement until prices are lifted above present levels. Recent high prices for U. S. scrap have made it almost impossible to bring scrap into this country, but some big Canadian consumers have imported large tonnages from Europe and Great Britain. Domestic supply of scrap is said to be only about 10 per cent of requirements, and at prevailing prices collectors state it is not worth their time to go into the rural districts and dig out scrap from the farmers.

Predicted for This Year
Prospecting by Helicopter

Full-scale helicopter propecting will get underway in Canada, the United States and Central America this year as the result of experiments conducted last summer, Hans T. Lundberg, vice president, Lundberg-Ryan Air Explorations Inc., New York, said recently.

Pointing out that the helicopter can save time and money, Mr. Lundberg

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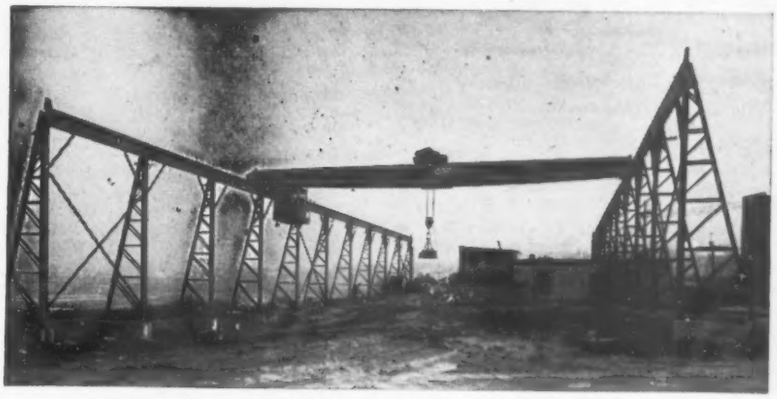

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stated that a helicopter with only two men can survey in one hour the same area that it takes four men to cover in 70 days on the ground.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6600 tons, veterans hospital, Ft. Hamilton, Brooklyn, N. Y., to Bethlehem Steel Corp., Bethlehem, Pa.

4000 tons, plant addition, Yale & Towne Mfg. Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1050 tons, power plant, Cambridge Gas & Electric Co., Cambridge, Mass., to A. O. Wilson Structural Co., Cambridge, through owner; Gilbert Associates Inc., Reading, Pa., engineer.

300 tons, telephone building, Taunton, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Gilbane Building Corp., Providence, R. I., contractor.

275 tons, machine shop and boiler house, Schmid & Sons Brewery, Philadelphia, to Morris, Wheeler & Co., that city.

170 tons, state bridge, Lancaster-Chester counties, Pa., to American Bridge Co., Pittsburgh.

165 tons, building, Flatbush Savings Bank, Brooklyn, N. Y., through Edward Corning Co., Manhattan, N. Y., to Bethlehem Fabricators, Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4500 tons, office and warehouse, Chrysler Corp., Newark, Del., bids asked Apr. 11, Albert Kahn Associates, Detroit, engineers in charge.

1070 tons, continuous beam bridge over Pennsylvania railroad, Lansing Township, Ill., for Cook county; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

950 tons, bascule bridge, Hampton Beach, N. H., readvertised.

750 tons, addition to Bayside Stations, Green Bay, Wis., preliminary.

710 tons, continuous beam bridge over Little Calumet river, Thornton Township, Ill., for Cook county; Arcole Midwest Corp., Chicago, low; bids March 19.

685 tons, Willow road grade separation, Northfield, Ill., for Cook county; Midland Structural Steel Co., Chicago, Ill., low; bids March 19.

650 tons, parochial school, Westchester county, N. Y., bids asked by George A. Fuller Co., New York.

620 tons, continuous beam bridge over Greenwood Rd. and Pennsylvania railroad, Thornton Township, Ill., for Cook county; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

525 tons, sheet piling, Garrison dam, Garrison, N. D., for U. S. Engineer; bids March 27.

350 tons, approach spans, Rt. 1, Connecticut river bridge, Old Lyme, Conn.

250 tons, addition, Woodville state hospital, Allegheny county, Pa., bids to be opened at Harrisburg, Pa., Apr. 2.

240 tons, factory building, Jamestown Metal Equipment Co., Jamestown, N. Y. G. C. Warren Construction Co., that city, awarded general contract.

217 tons, 159th St. grade separation, Calumet City, Ill., for Cook county; Arcole Midwest Corp., Chicago, low; bids March 19.

203 tons, highway bridge FI-142(17), Winnebago county, Ill., for state; bids March 28.

200 tons, state bridge, Cambria county, Pa., new bids closed Mar. 28.

153 tons, bridge S930(2), Richland, Keokuk county, Iowa, for state; bids March 17.

150 tons, theater, Milford, Del., bids asked.

136 tons, bridge S269 (2), Delta, Keokuk county, Iowa, for state; bids March 17.

128 tons, bridge S0545 (1), Marinette county, Wis., for state; bids March 25.

120 tons, state bridge, Cambria county, Pa., rebid Apr. 11.

108 tons, sheet piling, park work, Fond du Lac, Wis., for city; bids Feb. 15.

100 tons, city bridge, Sedgeley Ave., Philadelphia, bids April. 11.

100 tons, Burnham Ave., grade separation, for Cook county, Ill.; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

REINFORCING BARS . . .

REINFORCING BARS PENDING

1200 tons, Holyoke dike, Connecticut river flood control project; U. S. Engineer, Boston.

1000 tons, Hippodrome building, St. Paul, increased from 600 tons; bids March 19.

425 tons, highway and bridge requirements, Connecticut.

353 tons, Tri State parkway, Sec. 193-2525.1, for Cook county, Ill.; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

300 tons, Teachers College, St. Cloud, Minn.; bids March 18.

269 tons, Calumet grade separation, Sec. 066-0505.3, for Cook county, Ill.; Arcole Midwest Corp., Chicago, low; bids March 19.

225 tons, Calumet Parkway, Sec. 066-0505.2, for Cook county, Ill.; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

200 tons, building; W. E. Scrafft & Sons Corp., Charlestown District, Boston.

175 tons, bars, also 560 tons bar joists, housing project, Bellwood, Ill.; bids taken March 14 considerably over estimate and may be rejected.

119 tons, Tri State highway, Sec. 193-2526.1, for Cook county, Ill.; Thomas McQueen Co., Forest Park, Ill., low; bids March 19.

111 tons, 159th St. grade separation, Sec. 066-0405.1, for Cook county, Ill.; Arcole Midwest Corp., Chicago, low; bids March 19.

100 tons, including miscellaneous, Lookout Point dam, Lane county, Oreg.; bids to U. S. Engineer, Portland, Mar. 27.

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PLATES . . .

PLATES PLACED

4350 tons, ten storage tanks, Port Arthur, Tex., for Texas Co., to Chicago Bridge & Iron Co., Chicago.

1735 tons, four storage tanks, Port Neches, Tex., for Texas Co., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

150 tons, standpipe, Brewer, Me.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atchison, Topeka & Santa Fe, 500 forty-ton all-steel box cars, to Pressed Steel Car Co., Pittsburgh.

Canadian National Railways, 500 all-steel automobile cars, to Canadian Car & Foundry Co., Montreal.

Canadian National, 1500 fifty-ton box cars and 500 forty-ton automobile cars, to American Car & Foundry Co., Montreal, 1700 fifty-ton box cars to Eastern Car Co., New Glasgow, N. S., and 500 fifty-ton box cars and 150 seventy-ton hopper cars to National Steel Car Co., Hamilton, Ont.

Canadian Pacific, 2500 fifty-ton box cars, with 1750 going to Canadian Car & Foundry Co., Montreal, and 750 to National Steel Car Co., Hamilton, Ont.; also 325 fifty-ton refrigerator cars and 120 fifty-ton automobile cars to National Steel Car, and 250 seventy-ton hopper cars to Eastern Steel Car Co., New Glasgow, N. S., and 50 cabooses to its own shops.

Southern Railway, 4000 freight cars, with 3000 box cars going to Pullman-Standard Car Mfg. Co., Chicago, and 1000 hoppers to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

New York city, Board of Transportation, is expected to bring out specifications early in April for 150 subway cars.

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BERKELEY, CALIF.—Pacific Aluminum Window Co. has been formed by E. P. De Garmo with 2000 shares of no par value capital stock to engage in light manufacturing of all types of metal articles. Firm is represented by Eugene Elerding, 404 Bank of America Bldg.

LONG BEACH, CALIF.—Pacific Coast Tank & Mfg. Co. has been formed with 500 shares of no par value capital stock by C. S. Thompson, to manufacture and fabricate steel. Firm is represented by John R. Nimocks, 212 Lambert Bldg.

LOS ANGELES—Keystone Bolt & Supply Co. has been formed by George A. Wutt with a capital of $50,000.

LOS ANGELES—General Pipe & Supply Co. Inc. has been formed by Jean Z. Perick with a capital of $200,000.

LOS ANGELES—Marshall Tool & Supply Co. will build a warehouse containing 10,000 sq ft of floor space at 2842 E. Olympic Blvd. Cost will be $56,000.

OAKLAND, CALIF.—Miller Materials Co. has been formed by August J. Miller with a capital of $200,000 to manufacture metal products. Firm is represented by Henry H. Irwin, Central Bank Bldg.

REDWOOD, CALIF.—Allied Engineering & Mfg. Corp. has been organized by Misha Bogart with a capital of $50,000 to manufacture tools and dies. Firm is represented by McCarthy & Rowell, 2024 Broadway.

SAN FRANCISCO—Pauli & Griffin Co. has been formed by James T. Davis with a capital of $75,000 to engage in manufacture, sale and distribution of steel and allied products.

SAN FRANCISCO—Pacific Industrial Mfg. Co. has been formed by James B. Castle with a capital of $100,000 to manufacture and deal in industrial machinery, front loaders and cranes.

SOUTH GATE, CALIF.—Autoweld Corp. has been formed by William H. O'Donnell with a capital of $100,000 to manufacture, sell and distribute tanks. Firm is represented by William A. Wittman, 8179 Seville Ave.

FLORIDA

MIAMI, FLA.—Powell Bros., Fort Lauderdale, Fla., have $530,000 contract for additions to city's steam electric generating plant. Engineer is Ebasco Services Inc., New York.

QUINCY, FLA.—Talquin Electric Co-operative Inc. will spend $700,000 for 348 miles of line and other system improvements.

TAMPA, FLA.—Florida Portland Cement Division, General Portland Cement Co., will start a $140,000 construction project, first phase of a $1,250,000 expansion program. Initial construction will be on two buildings to house 426-foot steel kiln.

GEORGIA

ATLANTA—Acme Steel Co., Stewart Ave., will soon negotiate a contract for construction of office and warehouse costing $60,000. Architects are Cooper, Bond & Cooper.

CHAMBLEE, GA.—Westinghouse Electric Mfg. Co. has let a $500,000 contract to Henry C. Beck Co., First National Bank Bldg., for construction of office and warehouse on Peachtree Rd.

HOGANSVILLE, GA.—J. W. Goodwin Engineering Co., Birmingham, will prepare plans and specifications for town gas system, cost of which is estimated at $500,000.

LAGRANGE, GA.—J. W. Goodwin Engineering Co., Birmingham, will prepare plans and specifications for city gas system, cost of which is estimated at $1,500,000.

ILLINOIS

FRANKLIN PARK, ILL.—Thompson Wire Co. has awarded a $60,000 contract for a 1-story factory addition to Austin Co., 510 Dearborn St., Chicago.

ROCKFORD, ILL.—Central Illinois Electric & Gas Co. has let contract to Stone & Webster Engineering Corp., Chicago, for power plant, boiler house and spur railroad tracks to cost about $4 million.

IOWA

CRESTON, IA.—Southwestern Federated Power Co-operative Inc., will receive bids until April 23, 10 a.m., for construction of a power plant and three diesel generating units of about 1100-kw capacity each. Stanley Engineering Co., Hershey Bldg., Muscatine, Ia., is the engineer.

INDEPENDENCE, IA.—City contemplates erection of a $200,000 power generating unit in the municipal power plant.

RED OAK, IA.—National Carbon Co. Inc., 30 E. 42nd St., New York, plans construction of a battery manufacturing plant to cost about $1,750,000.

KENTUCKY

PADUCAH, KY.—Magnavox Co. will construct $1 million plant at N. 8th St. for manufacturing radio equipment and electrical supplies. $350,000 worth of equipment will be installed.

MISSISSIPPI

TUPELO, MISS.—Day-Brite Co. has begun construction of $200,000 fluorescent light fixture plant, 194 x 263 ft. $150,000 worth of machinery will be installed.

MISSOURI

FULTON, MO.—City has awarded a contract to Boland Construction Co., 2715 Dalton St., for construction of a boiler room and basin for its cooling tower and the municipal power plant. Contract price was $144,451.

ST. LOUIS—Monsanto Chemical Co., 1700 S. Second St., has received CPA approval for a $241,165 building to house steam generating facilities.

ST. LOUIS.—Confection Machine Co., 3412 Gravoia Ave., is erecting a 1-story, 40 x 110 ft factory.

TRENTON, MO.—City has awarded a contract to Fairbanks, Morse & Co., 13th & Liberty Sts., Kansas City, Mo., for the furnishing and installation of a 1600-hp diesel engine generating unit with exciter and auxiliaries in the municipal power plant. Contract price was $102,000.

NEBRASKA

BELLEVUE, NEB.—Central Nebraska Public Power & Irrigation District, R. O. Canaday, secretary, Hastings, Neb., will soon take bids for a steam generating plant to cost about $800,000. Sargent & Lundy, 140 S. Dearborn St., Chicago, are the engineers.

OMAHA, NEB.—Northwestern Steel Works has been newly formed by G. S. Olsen to engage in fabrication of steel and manufacture of steel buildings. Firm plans construction of 1-story steel fabricating plant, 60 x 80 ft.

NEW YORK

ROCHESTER, N. Y.—Rochester Gas & Electric Corp. will begin a $25 million expansion program with construction of a steam power plant on the lake shore which will cost $8 million.

NORTH CAROLINA

CLIFFSIDE, N. C.—Duke Power Co. has CPA approval for a power plant costing $595,000.

SANFORD, N. C.—Central Electric Membership Corp. will spend $332,000 to complete improvements and to construct 170 miles of line.

OHIO

BEREA, O.—Exalco Mfg. Co., George H. Foster, principal, has been formed at 306 Mills St. as a foundry business.

CLEVELAND—Lawrence Die Casting Co. has been formed by Louis Kaufman, 1090 Union Commerce Bldg., for the production of nonferrous metal castings.

OREGON

UMATILLA, OREG.—Bids will soon be awarded for preliminary construction of proposed $180 million McNary dam on the Columbia river near here. This contract involves construction of a navigation lock, an overhead highway pass and miscellaneous work.

SOUTH CAROLINA

LAURENS, S. C.—Laurens Electric Co-operative Inc. will spend $460,000 for system improvements and 232 miles of line.

TENNESSEE

BOLIVAR, TENN.—Town has REA funds of $290,000 for 170 miles of distribution lines.

CHATTANOOGA, TENN.—Turnbull Cone & Machine Co., W. W. Turnbull, president, will erect an addition to double size of present plant at 212 W. 14th St. To cost $100,000, addition will be 4-story structure 100 x 120 ft.

TEXAS

BEAUMONT, TEX.—Magnolia Pipeline Co. plans a pipeline system costing $3,531,000 between Texas cites of Beaumont, Houston, Austin, Waco, Dallas and Fort Worth.

BONHAM, TEX.—Fannin County Electric Co-operative will spend $425,000 for 294 miles of lines and system improvements.

FORT WORTH, TEX.—Central Portland Cement Co. will spend $30,000 in extending its burning platform and kiln. $50,000 worth of equipment will be installed.

HOUSTON, TEX.—Westinghouse Electric Co., A. W. Watt, engineer, Pittsburgh, has plans nearing completion for manufacturing and repair shop, lamp manufacturing building and 2-story office building at Clinton Dr. and Kress St. Cost will be $703,833.

SAN ANTONIO, TEX.—Armstrong Tire & Rubber Co., W. A. Murphy, treasurer, Natchez, Miss., will spend over $71,000 for construction of 1-story building, 90 x 160 ft at 6050 San Pedro Ave.

VIRGINIA

BOWLING GREEN, VA.—Virginia Electric Co-operative will spend $337,000 for system improvements and 221 miles of line.

WASHINGTON

LONGVIEW, WASH.—Cowlitz county will open bids here April 14 for $175,000 project which calls for modernization of steam plant and installation of two boilers. H. W. Beecher, Seattle, is the engineer.

TACOMA, WASH.—St. Regis Paper Co. has received CPA approval for a proposed $975,000 plant.

WALLA WALLA, WASH.—Pacific Power & Light Co. announces a $584,500 construction and expansion program in this area which will include substations and new equipment.

CANADA

PRINCE RUPERT, B. C.—Celanese Corp. of American has selected Watson Island, eight miles south of here, as the location for a proposed $15 million plant to produce cellulose for chemical purposes. Production is planned in two years.

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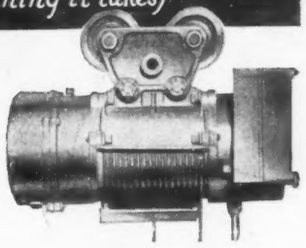

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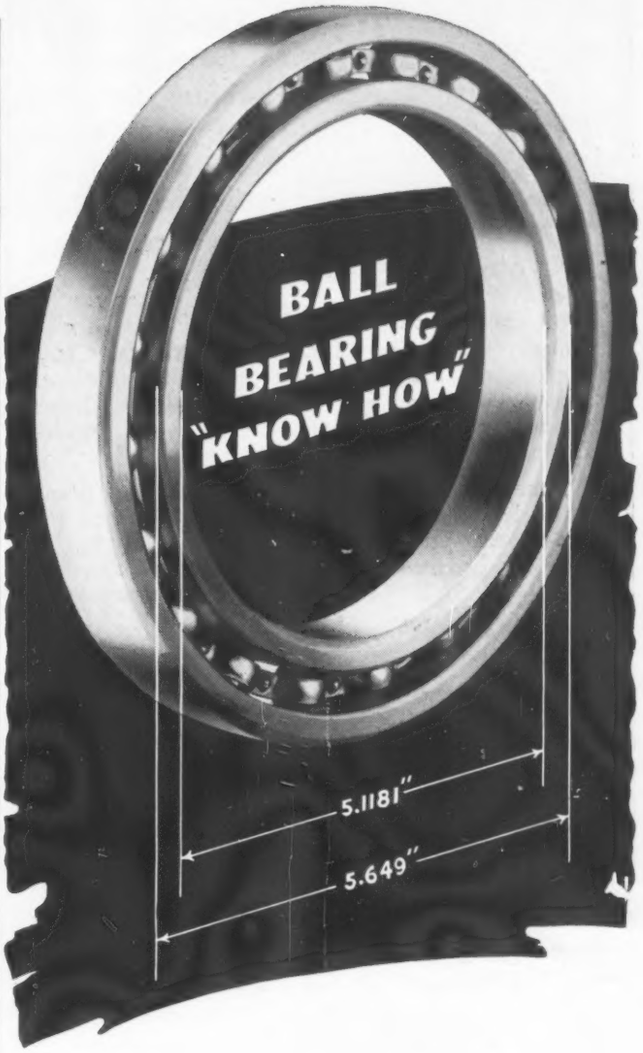

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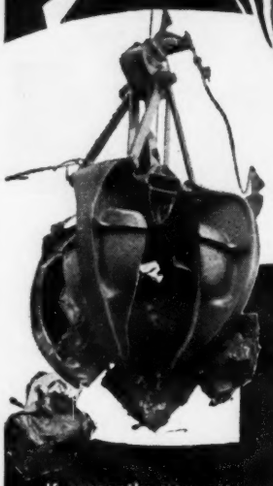

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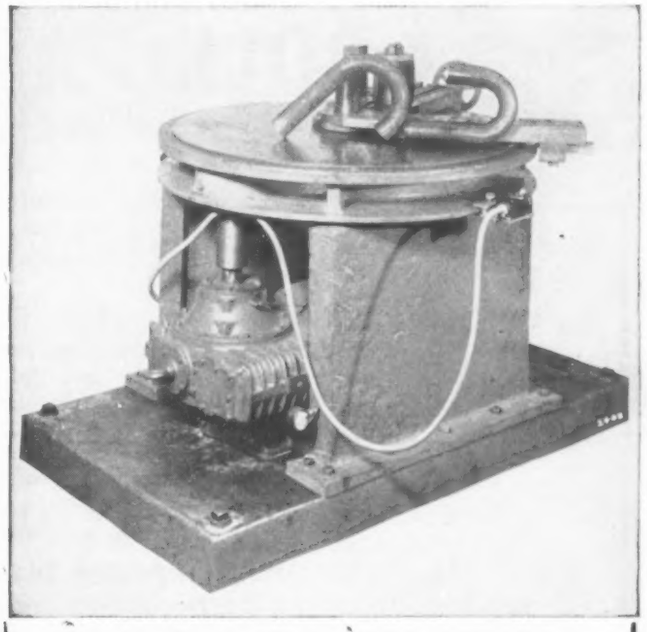

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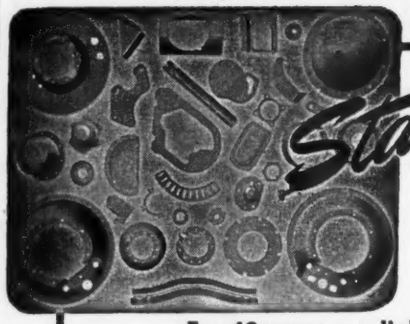

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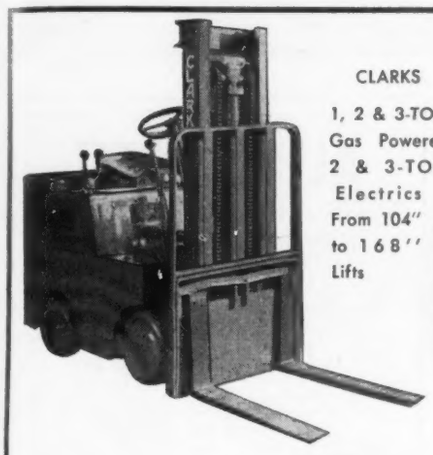

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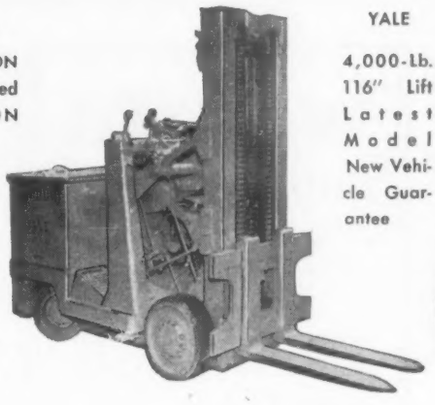

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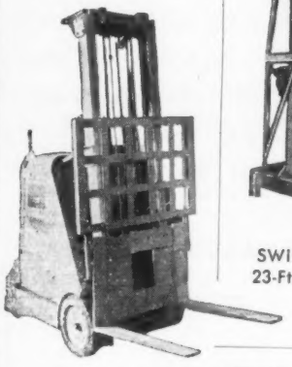

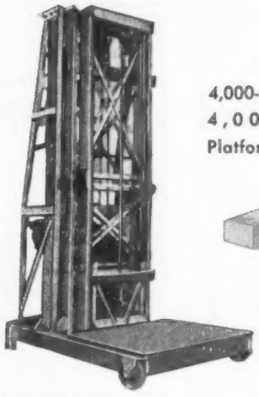

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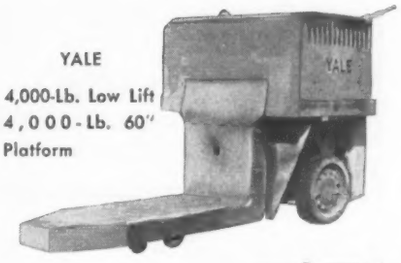

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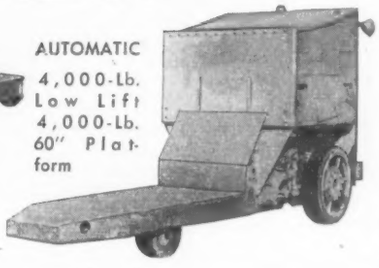

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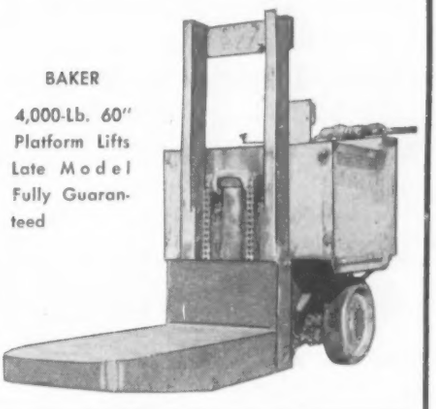

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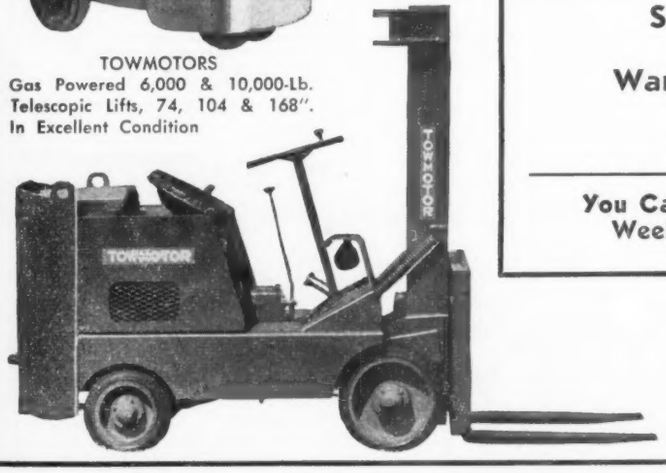

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• Can also use same sizes in thicknesses of 2" to 3". Can handle used plate if in good condition and not pitted. Write, wire or phone.

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215 Main Street, Buffalo 3, N. Y.
Telephone CLeveland 6349

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ROUND, HEX, SQUARE BARS

New York and Pittsburgh Warehouse Stocks

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50 tons 10" BP Beams 42lb. Random Lengths
59 tons 14" BP Beams 102lb. Random Lengths
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Telephones 3670 & 4-1464

Wanted—SHEARINGS

Any Amount—All Sizes, Galvanized, Cold and Hot Rolled Aluminum—Stainless and Copper. 6" Minimum Width to 36" Minimum Length. Uniform Quantities. Gauges from 16 to 30 Inclusive.

Write or Wire
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TRinity 4713

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We have for immediate delivery, good Burlap Strippings in rolls of various dimensions, namely, 4x6, 4x8, 4x10 or any other sizes made to fit your requirements for shipping Bar Steel. Our prices are reasonable.

For sample roll and quotations, please write to

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68,000 lbs. ¼" O.T. Spring Wire in Coils F.O.B. our Toledo, Ohio warehouse.

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Phone: Randolph 7055

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30—29'-8⅝" diameter x 8' ½" high (API) Columbian Tank Manufacture and Design. 12 gauge shell, deck and bottom. Tanks complete with bolts, gaskets, fittings, thief hatches, etc., and properly crated for domestic or export shipment. Priced attractively for quick removal Anniston, Alabama.

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No. 4 Roots Power Blower
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TRACK ACCESSORIES
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EVERYTHING FROM ONE SOURCE

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PITTSBURGH CHICAGO
NEW YORK SAN FRANCISCO

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GRINDER, Knife 10' Bridgeport, M.D.
GRINDER, Surface #16 Blanchard, 26" chuck.
HAMMERS, 4-B Nazel 5" x 5" M.D.
LATHE, Turret 24" Gisholt, 6¼" hole.
MILLERS, Plain Nos. 3 K&T and No. 4 Cin.
MILLERS, Vertical Nos. 3 & 4 Cin.
SHAPER, 36" Morton Draw Cut.
SLOTTER, 12" Putnam, 35" table, B.D.
STRAIGHTENER, Plate, 110" x 1¼", H&J.

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1208 House Bldg. Pittsburgh 22, Pa.

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TRACK ACCESSORIES
MIDWEST STEEL CORP.
Gen'l Off. CHARLESTON 21, W. VA.
Warehouses
CHARLESTON, W. VA.
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1 Carload ¾" Flat Plate Washers, Steel, 3" x 3" x 15/16" I.D. x 7/16" Thick

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Cable Address "FOSTER" Pittsburgh

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ELECTRICAL SHEET STEEL

Either Dynamo or Transformer grade, coated sheets, 24 or 26 gauge, 28" or wider by standard lengths. Phone, wire or write,

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Benton Harbor, Mich. Phone 5-2412

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NEW 1000 BBL. ALUMINUM TANKS

3—29'8⅜" Dia. x 8' ½" High Bolted, knocked-down, metal-thickness of shell, deck, and bottom 9 gauge throughout. Tanks complete with bolts, gaskets, fittings, and properly crated for domestic or export shipment. Priced for quick removal. St. Louis, Mo.

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Watson-Stillman, 48" Throat, 1½" Daylight.

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7,000 BARREL TANKS

43' Diameter by 28' 4" High

Used, good condition, dismantled, match-marked and available for immediate shipment from Philadelphia, Pa.

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65 North Madison
Ph. 2-9128 Tulsa, Okla.

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Canadian Rogers Sheet Metal & Roofing Ltd.

918 Palmerston Ave. Toronto, Canada

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Let us help you locate that machine or material which you need. A Wanted advertisement in this section will tell all our other readers of your requirements. Just write STEEL, Penton Bldg., Cleveland 13, outlining your needs and we will set up an attractive advertisement for you.

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EXPERIENCED TUBE MILL SUPERVISOR will take complete charge of teaching; and operating tube mills. All size tubes; inside flash removed; deformed tubes. Experienced on Yoder and privately owned tube mills, also roll forming machinery. Address Box 926, STEEL, Penton Bldg., Cleveland 13, O.

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Are you interested in acquiring the services of an individual who is capable of educating your personnel in successfully installing and maintaining a production control and/or a wage incentive plan without the usual high engineering cost? Address Box 922, STEEL, Penton Bldg., Cleveland 13, O.

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All classifications other than "Positions Wanted," set solid, minimum 50 words, 7.00, each additional word .14; all capitals, minimum 50 words 9.00, each additional word .18; all capitals leaded, minimum 50 words 11.00, each additional word .22. "Positions Wanted," set solid, minimum 25 words 1.75, each additional word .07; all capitals, minimum 25 words 2.25, each additional word .09; all capitals, leaded, minimum 25 words 2.75, each additional word .11. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request.
Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.

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Attention Steel Stamping and Manufacturing Firms

FOR SALE

TWO COMPLETE SETS OF DIES, JIGS AND FIXTURES

No. 1 set to produce popular steel outdoor chair.

No. 2 set to produce low priced tubular steel dinette set. Chairs have stamped steel seat and back. Table has new design tubular legs and wood or wood and composition top.

These are all in perfect operating condition and were designed and produced after V-J Day.

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BOLTON GATE CO., LTD., BOLTON, ENGland, are desirous of arriving at a working arrangement re the manufacture of their patent shutter gates, collapsible gates, etc. in the States. R. E. Morley will be visiting the States with a view to meeting interested, progressive, suitable organizations. Firms interested write Bolton Gate Co. Ltd., Bolton, England.

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Consulting Engineers

Manufacturing Buildings, Process Plants and Related Building Structures, Designs, Layouts and Details.

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To cover Western Pennsylvania for an established tool steel warehouse carrying a complete line of tool steels, drill rods, tool bits, etc. Only experienced men need apply.
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STEEL, Penton Bldg., Cleveland 13, O.

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Northern Ohio

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Address Box 929,
STEEL, Penton Bldg., Cleveland 13, O

Help Wanted

MECHANICAL ENGINEER

A semi-integrated steel company engaged in quality production has an opening for a mechanical engineer, preferably one who has had experience in design work collaborating with industrial engineers to obtain increased efficiency. The applicant should be a first class designer, and one with ingenuity and a background of leadership such as would enable him eventually to head the department. If these unusual qualifications can be found we are prepared to pay a commensurate salary. Give full details of education, experience, etc., in your first letter, which will be treated confidentially. Response will be prompt, and interviews granted where deemed advisable. Write Box 931, STEEL, Penton Bldg., Cleveland 13, O.

TOOL STEEL SALESMEN REQUIRED BY reputable New York Distributor with extensive stocks of cold work steels, one for each of the Philadelphia, Hartford, Connecticut and Boston, Massachusetts districts. Replies with details of experience, age, etc., treated confidentially, to Box 930, STEEL, Penton Bldg., Cleveland 13, O.

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SALARIED POSITIONS $2,500-$25,000. THIS thoroughly organized confidential service of 37 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. BIXBY, Inc., 110 Dun Bldg., Buffalo 2, N. Y.

SALARIED PERSONNEL $3,000 — $25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. JIRA THAYER JENNINGS, Dept. S, 109 Church St., New Haven, Conn.

Help Wanted

SCRAP YARD MANAGER

Long established scrap company has opening for an experienced yard manager in an Eastern Pennsylvania small city in large industrial area. Attractive proposition will be made to the right man.

Address Box 927,
STEEL, Penton Bldg., Cleveland 13, O.

WANTED
EXPERIENCED PURCHASING AGENT

With Engineering education. Large Southern concern. Give full details first letter.

Write Box 911
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GRADUATE MECHANICAL ENGINEER TO fill position of general plant engineer in steel mill and fabricating concern of approximately 500 employes. Duties principally in connection with technical methods, machinery, and equipment. Should have no less than five years' experience in this field. Permanent position and excellent opportunity offered for the right person. Give full details as to prior experience, education, etc. Reply Box 898, STEEL, Penton Bldg., Cleveland 13, O.

IF YOU HAVE AN OPPORTUNITY TO OFFER

Use the "Help Wanted" columns of STEEL. Your advertisement in STEEL will put you in touch with qualified, high-calibre men who have had wide training in the various branches of the Metal Producing and Metalworking industries.

Help Wanted

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Unusual opportunity for a man of these qualifications: Experience with metal cutting tools and machine tools, equivalent of a mechanical engineering degree, administrative and selling ability, imagination and initiative. Age 35-42.

Address Box 918,
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Excellent opportunities for men in small Illinois town less than 70 miles West of Chicago. Homes and gardens available this summer.

SUPERINTENDENT for precision grinding on gauges and on production.

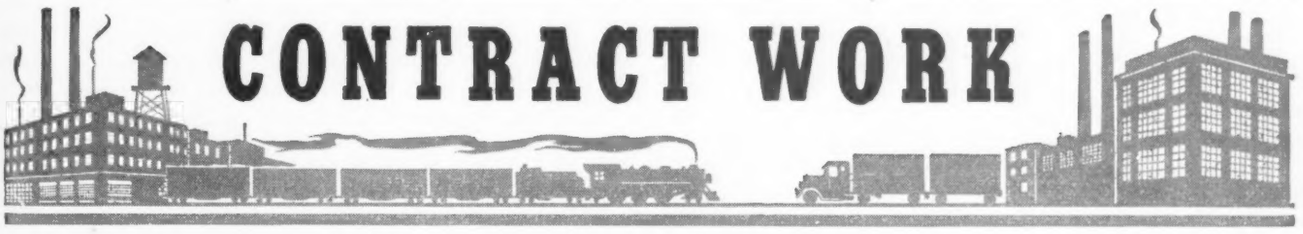
SUPERINTENDENT for turret lathes and auto screw machines on secondary operations.

SUPERVISOR for precision finishing of gauges.

TOOL CRIB attendant familiar with gauges.

Write age, experience, salary required to Box 925, STEEL, Penton Bldg., Cleveland 13, O.

STEEL BUYER—WANT AGGRESSIVE AND capable man who is completely familiar with steel buying procedure, to handle purchases of steel for a large industrial concern. State salary expected and furnish references in first reply. Location: Southern part of the United States. Address Box 919, STEEL, Penton Bldg., Cleveland 13, O.



SPECIAL MANUFACTURERS TO INDUSTRY... *Since 1905*

Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials

WRITE FOR FOLDER
LARGE SCALE PRODUCTION
OR PARTS AND DEVELOPMENT ONLY

GERDING BROS.
SE THIRD VINE ST. ● CINCINNATI 2, OHIO

Send us your inquiries on
PRODUCTION PARTS AND ASSEMBLIES
Viking High Speed Tool Bits
Special Taps
Commercial Heat Treating
Electro Plating
AGERSTRAND CORPORATION
Muskegon, Michigan

PLATES—FLAME CUT TO SIZE AND SHAPE

Latest burning equipment. We can furnish our own steel—accurate work—prompt service. We are also equipped to do welding and fabricating in connection with this service. Send us blue prints or templet for quotation.

THE TOLEDO IRON & STEEL CO.
A complete steel warehouse service
1819 Starr Ave. Toledo 5, Ohio

COMMERCIAL BRAZING

Copper Brazing	Hydrogen Brazing
Silver Soldering	Bright Annealing
Induction Brazing	Induction Heating

FOUR ULTRA MODERN TECHNICALLY CONTROLLED PLANTS IN:

Chicago, Ill.—Long Island City, N. Y.
Cleveland, Ohio—Valparaiso, Ind.

Please address inquiries to Exec. Offices

SALKOVER METAL PROCESSING
321 Dixie Terminal Cincinnati 2, Ohio

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As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

SPEEDAIRE saves colliery $416

THIS Speedaire Unit drives a Refuse Drag Conveyor in a West Virginia coal tipple. It operates for two eight-hour shifts every day in a dusty atmosphere and saved the coal company $416.50 This is 35.6% under the cost of a conventional worm gear speed reducer required to do this job

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantage of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

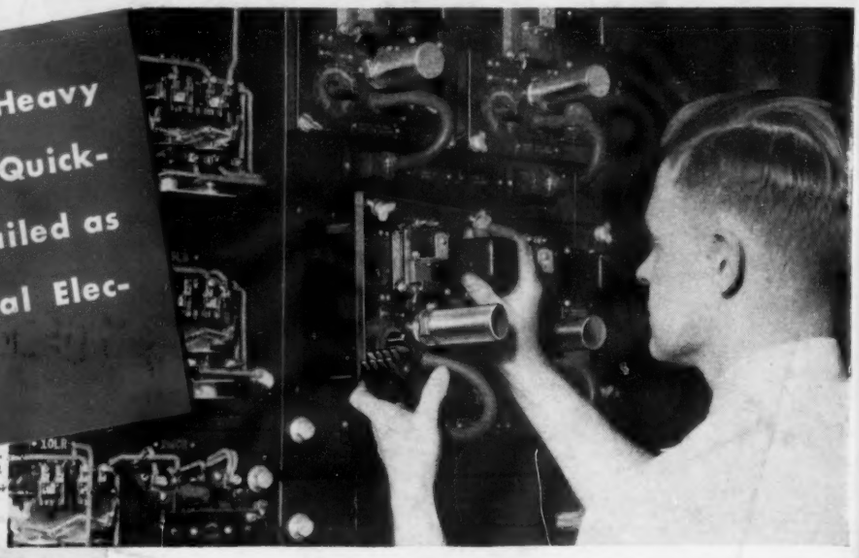
For full description, send for Catalog 300 The Cleveland Worm & Gear Co., 3270 East 80th Street. Cleveland 4, Ohio.

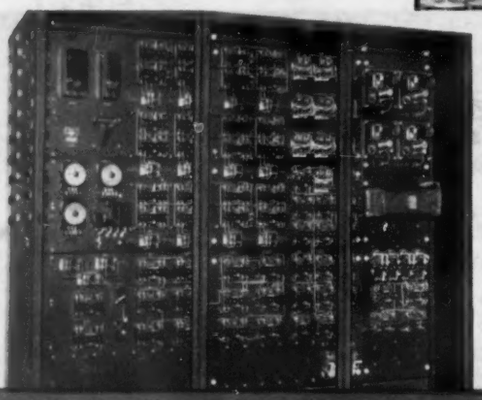
Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

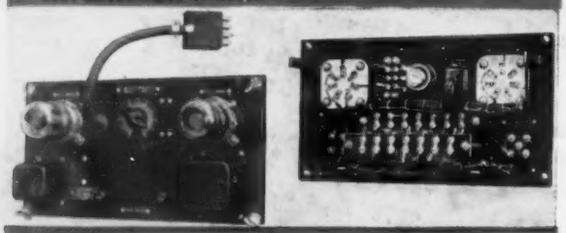
Now . . . *Electronics to Mill Standards*

New Cutler-Hammer Heavy Duty Construction and Quick-Change Unit Panel Hailed as Outstanding Industrial Electronics Contribution.

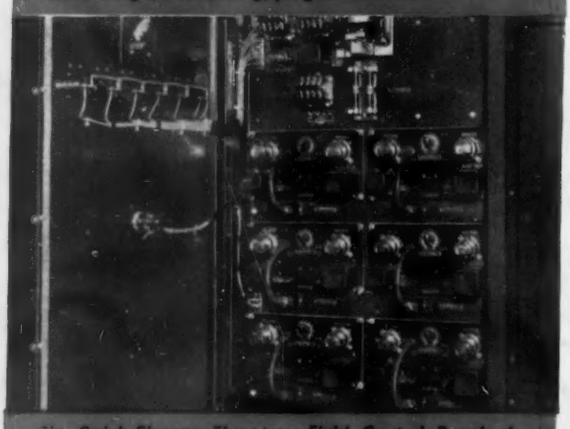




C-H Supervisory Electronic Quick-Change Units on Enameling Furnace Control Panel. Here C-H Magnetic and Electronic Control is engineered to achieve the full practical advantages of both.



Front and back of Quick-Change Unit Panel. Note simplicity, ruggedness, wiring, spacing. Also screw terminals, wing nut mounting, plug-in connector.



Six Quick-Change Thyratron Field Control Panels for conveyor synchronizing control in rubber mill.

To the public, industrial electronics is a miracle maker. To many a mill's electrical department its practical application now becomes a reality.

Equipment has been fragile and complex . . . tough to install and remove, to test and inspect.

The Cutler-Hammer answer to mill duty electronics is a development now almost four years old, hailed by leading industrials as an outstanding contribution to practical electronics.

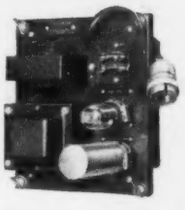
First of all, Cutler-Hammer engineers took electronic control equipment out of the radio receiver class and built it up to heavy duty industrial standards. Components are simple and rugged, minimum in number, better spaced, better wired and designed expressly for easy renewal of parts.

The introduction of the C-H Quick-Change Unit Panel now safeguards continuous mill operation plus other important advantages. Components are now mounted as a unit on a removable panel, assembled to the control board by means of captive wing nuts with plug-in connector. Inspection and instrument testing, back at the service bench is convenient because removing one electronic control panel and substituting a "spare" in its place is the matter of a moment.

These sane and sound solutions are another product of Cutler-Hammer's "electronics-in-industry" experience dating back to 1916. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wis. *Associate*: Canadian Cutler-Hammer, Ltd., Toronto, Ont.

CUTLER-HAMMER
ELECTRONICS
C-H

(at left) Typical C-H Mill Type Quick-Change Unit Panel for Furnace Control.



(at right) C-H Quick-Change Unit Panel for photo-electric limit switch used on automatic tube cut-off machine.